Coal Age

JULY, 1957

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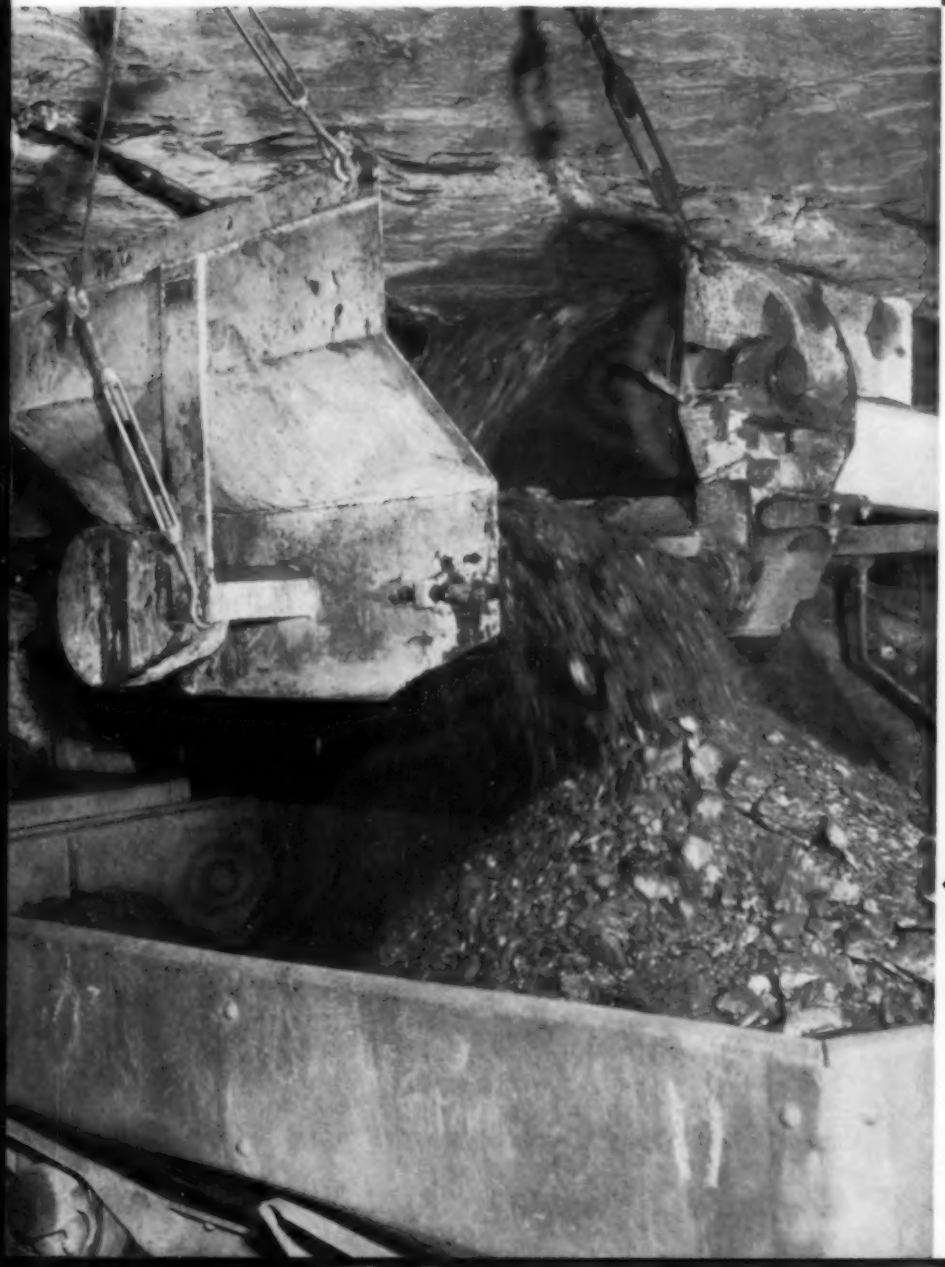

Financing Coal's Future Growth

What a coal company should be and do in setting out to secure financial backing to meet increasing demands. p 50

Strip, Auger 40,000 Tons per Month

Good blasting in difficult overburden with low-cost explosives and efficient augering produce high yield. p 60

Fire Control For Today's Mining

Equipment, training, organization are teamed to provide top-notch protection for life and property. p 66

Efficient Mining, Planned Maintenance

How Warner Collieries uses bridge conveyors or shuttle cars in engineered systems to get high face productivity. p 54

Full Contents p 5

"IN CASE OF EMERGENCY"

Mine emergencies happen without warning . . . and when they do happen, equipment that carries the "in case of emergency" label suddenly becomes vital to fire fighting and rescue efforts. Breathing protection devices are a major part of emergency mine equipment.

Below is a check list of this equipment offered by MSA. If you would like to make sure your emergency program is up-to-date, why not have our representative check your requirements and suggest a regular inspection and maintenance schedule.

M-S-A McCAA® Oxygen Breathing Apparatus—
gives complete breathing protection in any unbreathable atmosphere for a minimum of two hours. Used under the hardest physical conditions . . . in fighting and sealing fires, re-establishing ventilation, and rescue operations. U. S. Bureau of Mines approved.

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allows complete breathing protection in any gaseous or oxygen deficient area for a minimum of 45 minutes. Generates its own oxygen supply from replaceable canister. Weighs only 13½ lbs. U. S. Bureau of Mines approved.

M-S-A All-Service Mask®—
assures safe, comfortable breathing protection against smoke and toxic gases including carbon monoxide—singly—or in combination where there is sufficient oxygen to sustain life. U. S. Bureau of Mines approved.

M-S-A Self-Rescuer®—
a miniature mask for use in deadly carbon monoxide following fire or explosion. Gives the miner precious minutes of emergency breathing protection. Unit is compact, lightweight; may be stored in quantity underground or carried individually. U. S. Bureau of Mines approved.

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M-S-A Pneolator®—
provides automatic artificial respiration that assures maximum chances of recovery for victims of poisonous gases, electrical shock, heart attacks, or other causes of asphyxia. Housed in compact, lightweight glass fiber case.

MSA
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At Your Service: 77 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S.

B.F.Goodrich report:

B.F.Goodrich belt resists fire, mildew and crushing impact

WHEN this Pennsylvania mine company ordered a B.F.Goodrich conveyor belt made with fire-resisting rubber, they took a big step toward increased mine safety without sacrificing belt life.

The belt has to be tough to take the 21 hours-a-day, 5 days-a-week service. It's exposed to dampness and mildew, must stand the crushing impact of 3 tons of coal each time a shuttle car unloads.

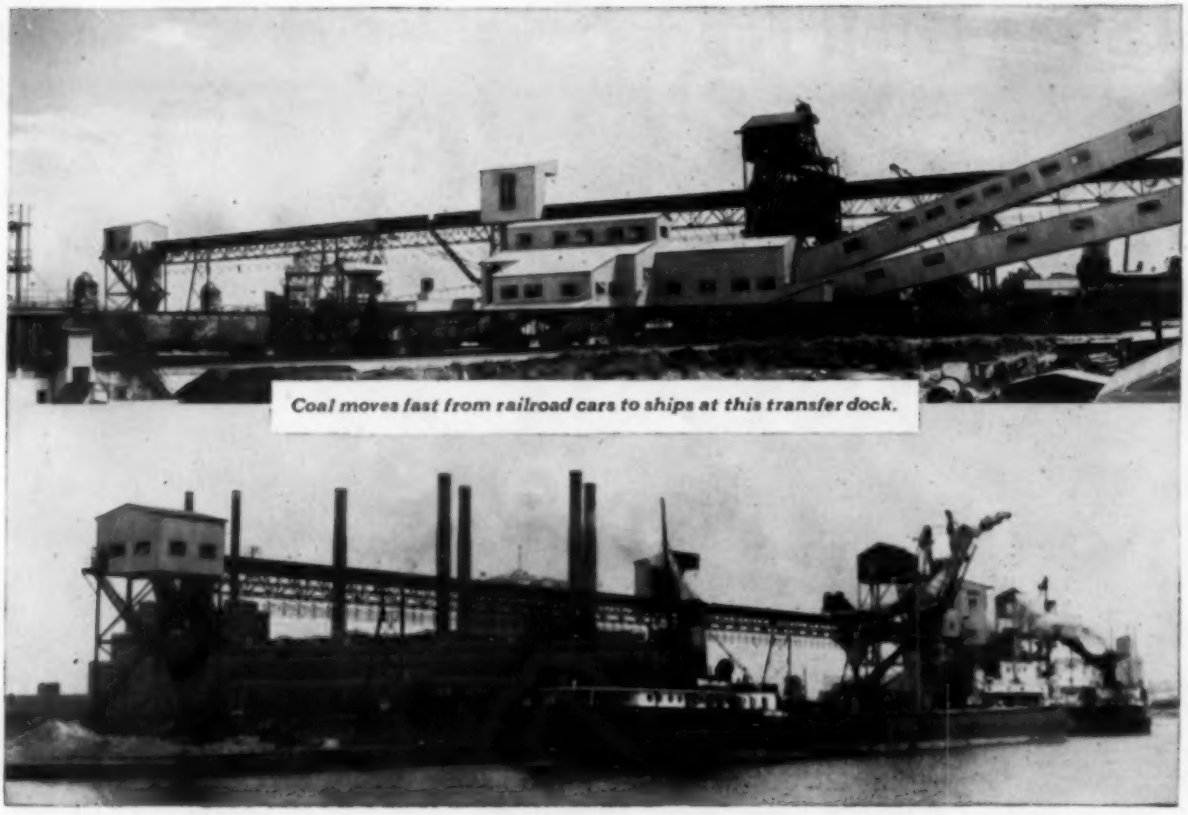
Yet this belt is expected to equal—or even surpass—the long service records made by other B.F.Goodrich Caricoal belts in underground service. That's because the special fire-resistant rubber used in the belt also has high resistance to impact, abrasion, oil, grease, tearing, cutting, gouging, and even mildew attack.

There is no fuel for fire in the rubber of this belt. The B.F.Goodrich fire-resisting belt will not support combustion or spread fire. All B.F.Goodrich belts made with the flame-resisting rubber have been accepted for listing as fire resistant by The Bureau of Mines (Acceptance No. 28-6).

Let your B.F.Goodrich distributor show you how longer-lasting Caricoal conveyor belts can cut your coal-handling costs, reduce maintenance costs, and if made with fire-resisting rubber, reduce the chance of fire in your underground mines. *B.F.Goodrich Industrial Products Co., Dept. M-111, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS



Coal moves fast from railroad cars to ships at this transfer dock.

Rapid handling improves competitive position of 29 participating coal companies

These 20 Jeffrey vibrating feeders can take 4,000 tons of coal per hour from hoppers under car shake-outs. Electronic controls vary the feed to assure a uniform rate of flow to the 72-inch conveyor belt that carries the coal to boat loading telescopic chutes.

COAL is transferred quickly, economically, from railroad cars to ships here at Rail-to-Water Corporation's Chicago docks. This permits the 29 Midwestern coal companies who are partners in this enterprise to sell their coal on the Great Lakes.

Typical equipment contributing to the speed which spells economy is this line of 20 Jeffrey electric vibrating feeders. They keep coal on the move with a minimum of attention, saving manpower. Vibrations are timed to their natural mechanical frequency, insuring minimum use of power and quiet, trouble-free operation. No wearing of parts, so maintenance costs and downtime are low.

Catalog 870 describes Jeffrey vibrating feeders. The Jeffrey Manufacturing Company, 912 North Fourth Street, Columbus 16, Ohio.

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The pin-point blasting that rips away the side of a hill for strip mining is just one of the many mining operations in which Simplex products play an important part. Simplex-TIREX trailing cords and cables, engineered especially for mining work, are on the job in and around mines everywhere. TIREX cables are newly improved for greater flexibility. Their cured-in-lead Neoprene Armor resists abrasion, oil, heat and water, and gives longest life.

SIMPLEX WIRE & CABLE CO.,
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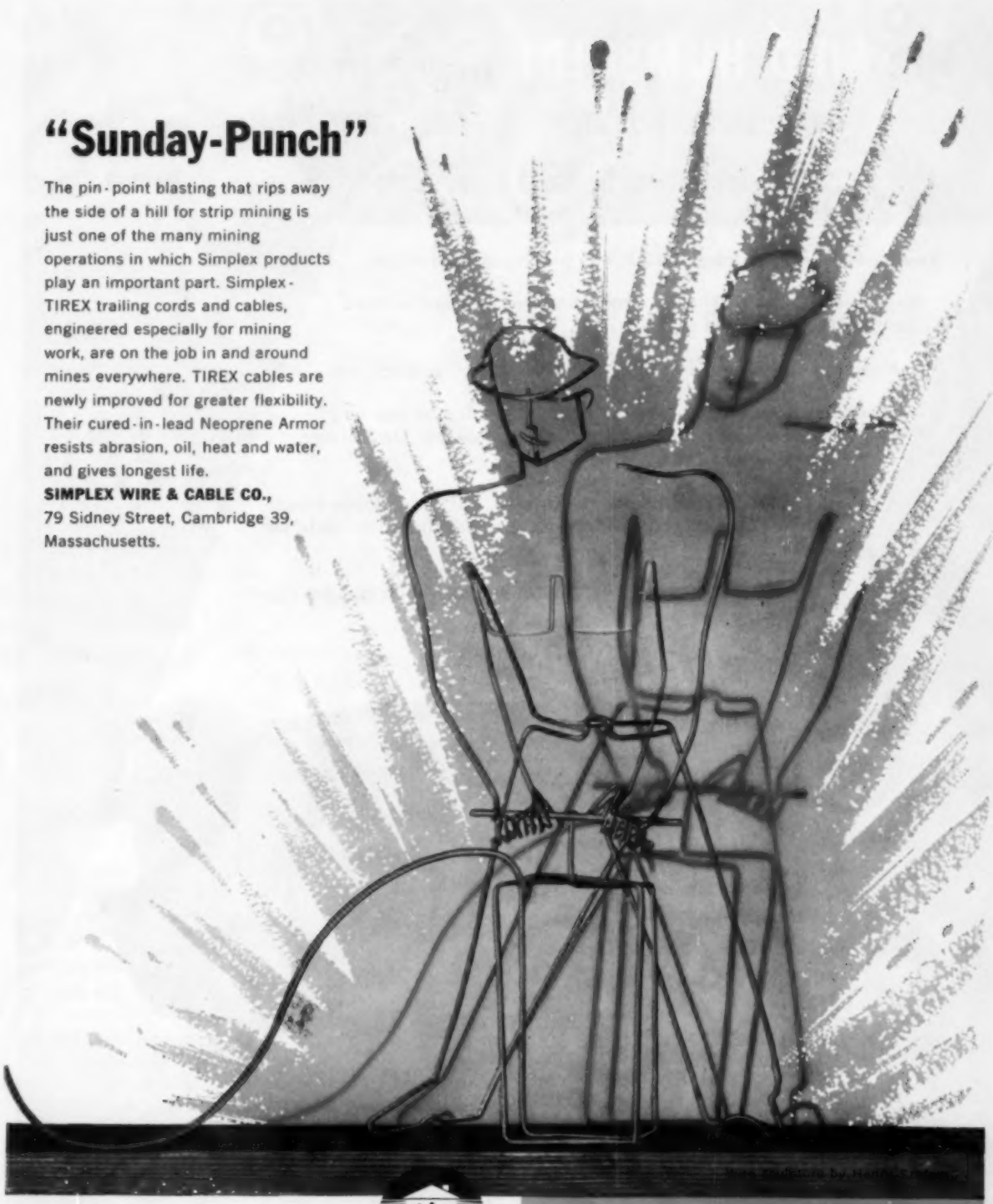
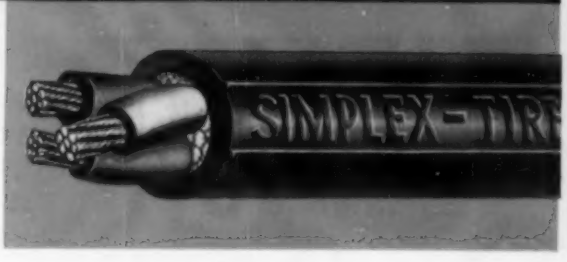


LIVE BETTER ELECTRICALLY

Simplex

TIREX



The BIRD HUMBOLDT *gives you one advantage after another*

. . . . in dewatering fine coal with a Screen Centrifuge

Low Power — on the order of 0.2 KWH per ton of dried solids.

Long Screen Life — 3000 hours or more has been obtained; screens last for months instead of hours.

Almost no Degradation of Solids — due to method of discharge.

Thorough Dewatering — Solids discharge as dry as can be obtained centrifugally. 5% or less surface moisture, for instance, on ¼ x 28 mesh coal.

98% to 99% Solids Recovery — For each 100 lbs. of solids input, less than 2 lbs. are found in the filtrate over the entire life of the screen.

High Capacity — 60 to 80 tons of coal per hour. Similar capacities on other materials.

Low First Cost

Never before performance and economy like this!

Ask us to mail you a copy of the new Bird-Humboldt Bulletin.

BIRD MACHINE COMPANY

SOUTH WALPOLE, MASSACHUSETTS

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This Month in Coal Age

Editorials ..... p 49
Financing Coal's Future Growth ..... p 50
Warner Combines Efficient Mining With Planned Maintenance ..... p 54
Stripping and Augering Yields 40,000 Tons per Month ..... p 60
Wanted: 50% Cut in Roof-Fall Accidents ..... p 64
Fire Control for Today's Mining ..... p 66
Maintaining Mining Bits ..... p 71
Big Volume Refuse Handling ..... p 76
Coal in Poland ..... p 80
Meetings Roundup ..... p 83
Foremen's Forum ... p 98 Operating Ideas ... p 102
Equipment News ... p 106 News Roundup ... p 136

► Management

Financing Coal's Future Growth ....p 50

John W. Spurdle, Dominick & Dominick, New York, N. Y.

The financing the industry must have to build the capacity that soon will be needed to meet demands for coal may come from public or other sources, but the values of public financing are stressed. Prospective investors will study past performance of the company, the quality and aggressiveness of management, the extent of the company's coal reserves, the capital structure and financial record of the enterprise, and whether or not the company seeking financial backing is a "career" unit in the industry and will move ahead with the industry. Trend toward consolidation of companies will result in corporate units of a size that will attract financial backing.

Highlight—Minimum size of a single mine that an investment banker can serve.

► Deep Mining

Warner Combines Efficient Mining With Planned Maintenance .....p 54

Combining engineering principles, operating skills and effective maintenance, Warner Collieries produces up to 76 tons per face man with bridge conveyors in rooms and as much as 70 tons per face man in shuttle-car sections at its Laurel Fork mine. This unusual performance results from the continual application of engineering techniques in a program designed to help management do its job more effectively.

Highlights—How double units in two producing sections are scheduled to permit systematic daily maintenance in triple-shift mining.

► Stripping and Augering

Stripping and Augering Yields 40,000 Tons per Month .....p 60

Shovel and dragline stripping is teamed with highwall augering in a triple-shift operation at Ohio River Collieries Co. Irregular nature of abrasive sandstone overburden and hard inclusions demand good blasting techniques in recovering 2½- to 4-ft rolling seam. Make-your-own blasting agent, made by mixing prilled ammonium nitrate and No. 2 fuel oil, cuts cost of breaking rock, improves fragmentation and eases digging. Self-moving 30-in auger adds 400 to 550 tons per day to output.

Sidelights—How deck loading is practiced to maintain proper powder ratio in varying cover; split-level mixing plant simplifies mixing of explosives.

► 1957-58 Safety Campaign

Wanted: 50% Cut in Roof-Fall Accidents .....p 64

All segments of the industry, working through a steering committee, launch a campaign to effect a 50% reduction in roof-fall injuries and fatalities in the year ending June 30, 1958. Any underground coal mine in the United States, Canada or elsewhere is eligible to participate. Promotional aids will be provided by the

(*Continued on page 7*)

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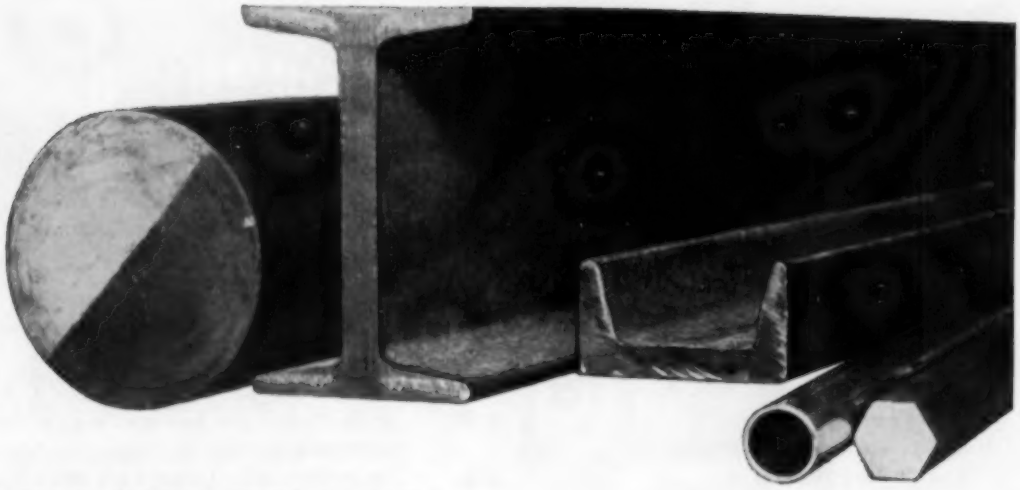

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3 major reasons keep them coming to Ryerson:

Flame-cut steel shapes save you money—one piece or hundreds—almost die-cut accuracy.

1. Biggest stocks—nobody comes even close to the size and variety of Ryerson inventories.

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3. Dependable, certified quality—at fair prices—whether steel is plentiful or scarce.

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CARBON STEEL—bars • structurals • plates • sheets tubing, etc.

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National Safety Council, and achievement awards will be presented at the close of the campaign.

► Fire Prevention and Control

Fire Control for Today's Mining . . . . p 66

Effective fire-control equipment, adequate training in the proper use of this equipment and top-level organization for handling emergencies are three major elements included in Pittsburgh Coal Co.'s program for preventing and controlling underground fires at extensive, highly-developed properties. Water, chemicals and rock dust are available in the face areas. Portable fire trucks back up the initial fire-fighting efforts of the men. Then the full resources of the company are brought to bear in the emergency. Face crews are instructed, step by step, in what to do in the event of a fire in their own section or if they are subjected to smoke from a fire in another section.

Highlight: How the program operates at Mathies mine.

► Cutting and Drilling

Maintaining Mining Bits . . . . . p 71

E. H. Johnson, Sales Manager, Mining Div., Kennametal, Inc. Bedford, Pa.

Realizing maximum economy in using tungsten-carbide bits in mining is a mining engineering problem, not a purchasing-agent search for the cheapest bit available. A sharp bit does the job faster with less power. Proper machine maintenance and close supervision of the men who regrind bits add to bit life and to more efficient cutting and drilling.

Added Features: Four pages of "how-to" pictures on grinding cutting-machine, auger-type and roof-drill bits.

► Refuse Disposal

Big-Volume Refuse Disposal at Vesta-Shannopin Plant . . . . . p 76

A combination of stationary and portable belt conveyors moves 5,000 tons of refuse per day uphill to a disposal area 1 mi from J & L Steel Corp.'s preparation plant. There, a stacker conveyor with a cantilevered boom spreads it in a semicircular pile 370 ft wide on a 0 to 10% grade. No major breakdowns have occurred in over 6 yr of operation. Cost of handling refuse, including operating and maintenance, is 8c per ton of rock.

Sidelight—What J & L has learned in 6 yr of experience with the system.

(*Continued on p. 11*)

This Month in Coal

266 MILLION TO GO—The bituminous industry produced approximately 250 million tons in the first half of 1957. If the forecast of 516 million for 1957 is to be met, the rate will have to step up at least 600,000 tons a week in the last half, or to an average of slightly over 10 million.

Even though a slower rate characterized the first half, the bituminous industry generally found it a good period from the standpoint of price stability and both gross and net income. With the experts in business forecasting generally foreseeing a better second half, bituminous should fare even better in the last 6 mo of 1957, not only because of good internal demand, including coal for home heating, but as a result of the continuing boom in exports.

Conclusion: 516 million or more for bituminous still is a realistic figure for 1957.

WARM WEATHER SLOWS ANTHRACITE—Hard coal rounded the mild-1957 turn slightly under the total for the corresponding period in 1956. This, however, was a definite improvement over the industry's position April 27, when it was nearly 16% off the 1956 pace.

The weather was, paradoxically, both villain and angel in the first-half showing. The first 4 mo were comparatively warm, but May turned out cold in most of the anthracite territory, generating a buying surge.

Outlook for the Year—Depending upon weather, all the way from 5% behind to even or better. An average or better-than-average cold fall and winter could, with exports continuing at a high level, make it even or better.

MORE IMMINENT—Each day of 1957 brings about a further buildup of the conditions that could result in another residual deluge on the Atlantic Coast—unless the administration takes more positive steps to prevent such a debacle than it has so far.

The level of imports still climbs, the major old-line importers are stepping up shipments to the U. S., and now the independent producers, who were among coal's staunchest allies, are looking at foreign concessions. In fact, several of the largest independents have set up in Venezuela and elsewhere, and presumably will soon be adding to the volume of foreign output—and equally presumably will be figuring on disposing of a major part of it in the United States.

Job for Coal—Maintaining pressure for reason in oil imports; being prepared with service and quality to back economy when the infighting starts.

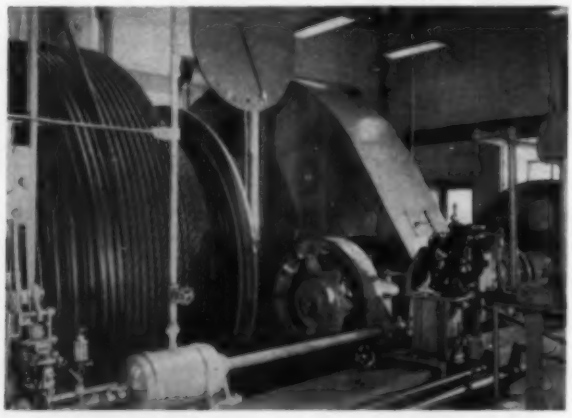
SIGNIFICANT START — Otterbein College and Walter J. Engel, one of the largest wholesale florists in Ohio have between them acquired and are now installing for fall use the first four units of the coal-fired automatic steam generator developed by Bituminous Coal Research, Inc. Thus coal is taking the second step in its campaign to stop the packaged oil-or gas-fired plant in its tracks.

The prospects are good that coal can do just that. The new BCR unit provides all the conveniences and advantages of other packaged jobs, and in addition offers a major saving in fuel costs. Look for a wide and increasing sale.

Will more tonnage per man-shift produce profits?

By 1960 most underground bituminous operators will have increased their output per man-shift by almost one-third—to almost 12 tons. Part of this increase will come from opening new mines; the larger part will reflect the use of new, more productive equipment.

But will profits keep pace with production? This is the important question. And its answer depends on how efficiently and economically each mine gets its tonnage out—as well as how fast.



TEXACO CRATER keeps wire rope strong longer, whether the lifts are measured in feet or miles. In addition to preventing friction between the strands, *Crater* keeps out water, acids and dirt which could cause corrosion or abrasion.

Proper lubrication can help you get tonnage out efficiently. Performed faithfully, it can keep both new and old equipment operating better longer—cut down-time and replacement costs. In the last analysis: it is your most economical method of increasing profit per ton.

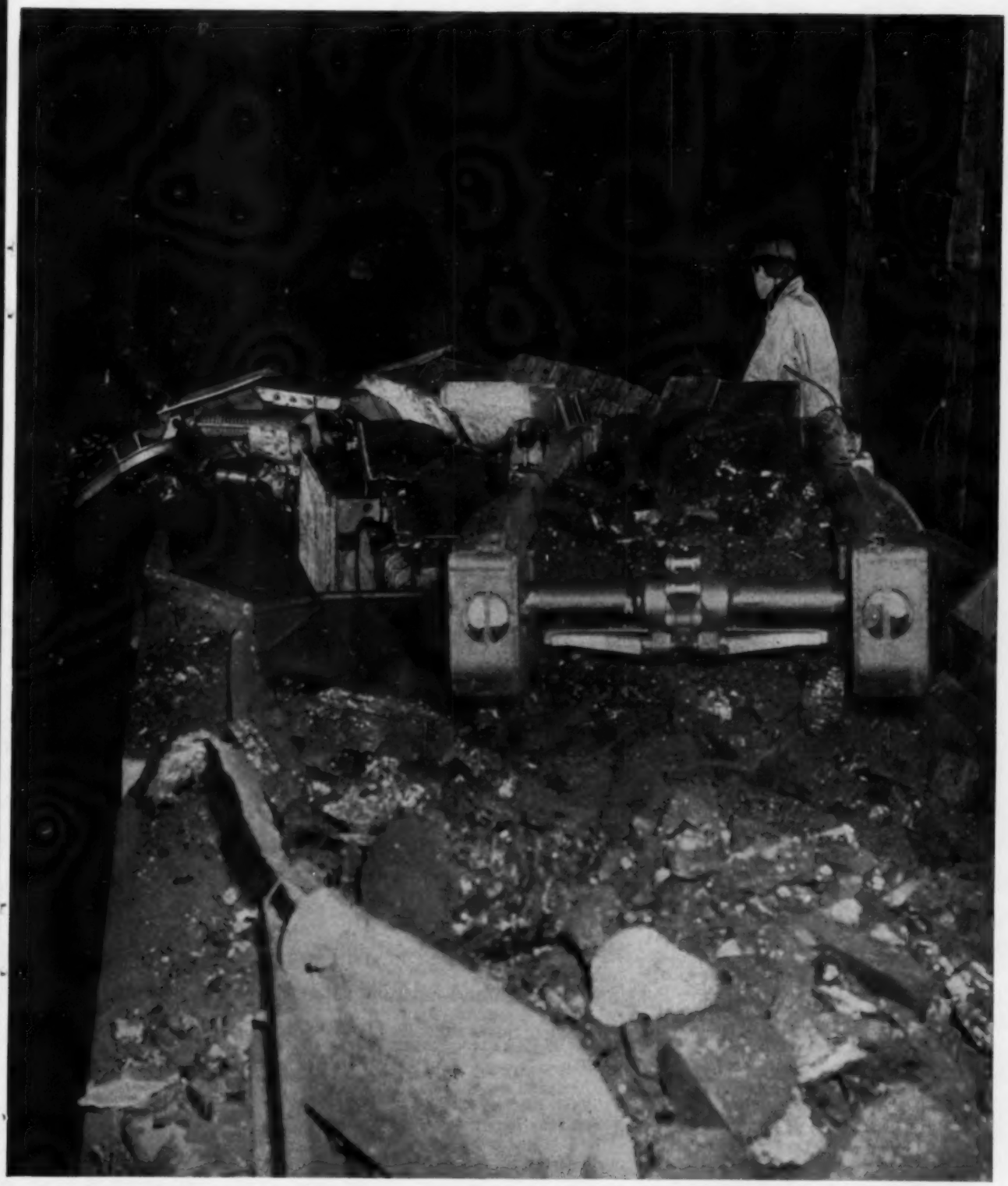
Use Texaco products for proper lubrication. They're made for the job. For example, *Texaco Multifak* is designed to provide simplified lubrication of anti-friction and sleeve bearings on continuous miners, loaders, cutting machines, locomotives and other equipment. It's the best lubricant for these bearings where there's water, dampness, dust and dirt. A lithium-base grease, *Multifak* pumps easily and remains stable regardless of the temperature.

For wire rope and open gears, apply *Texaco Crater* or spray on *Crater X Fluid*. These products keep wire rope strong longer—protect the teeth of open gears.

Need help in protecting both your new and old equipment? Consult your Texaco Lubrication Engineer. Call the nearest of more than 2,000 Texaco Distributing Plants in the 48 States or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

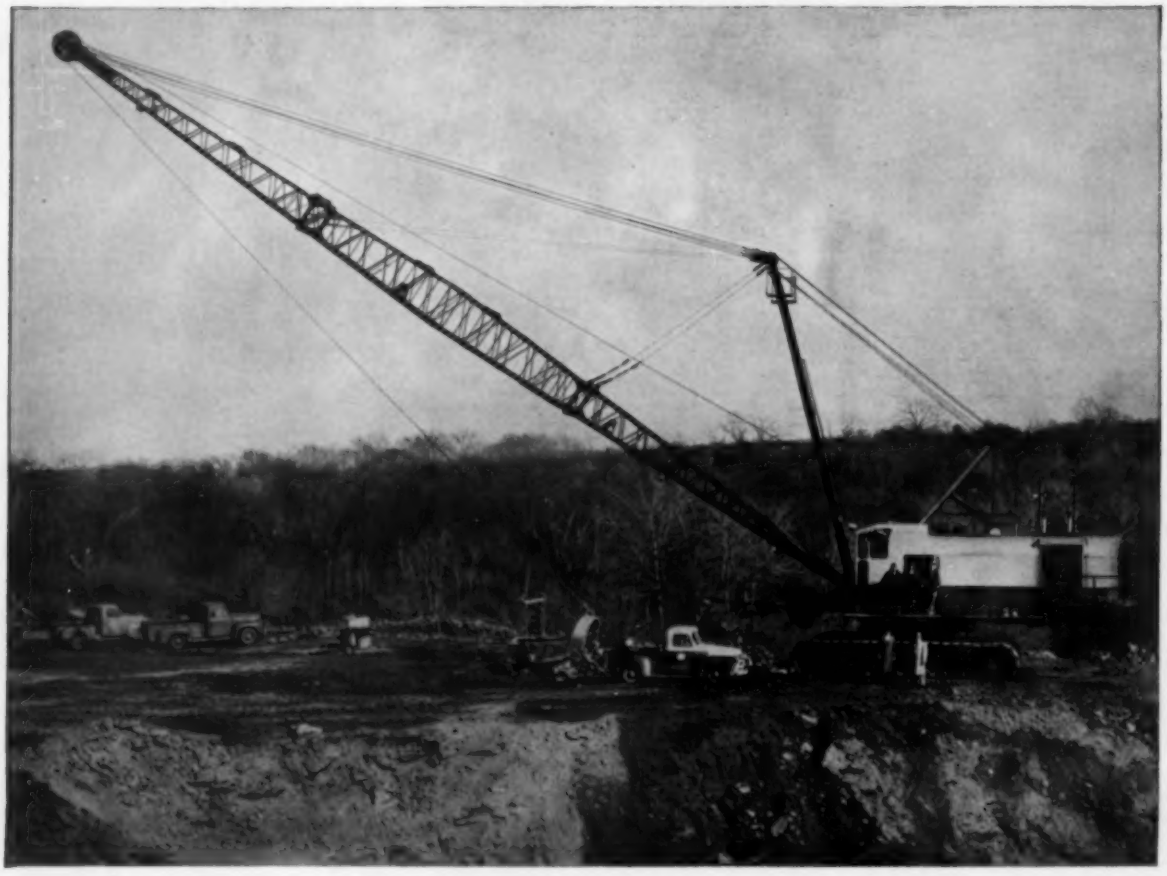
TEXACO

TEXACO



LUBRICANTS for the Coal Mining Industry

ANOTHER BIG COAL STRIPPING OPERATION LUBRICATED 100% WITH AMOCO LUBRICANTS



This Big Lima Shovel, equipped with a Caterpillar Supercharged Engine, requires lubricants that hold up under extremes of heat and pressure and fight deteriorating effects of contaminants. The answer? Such products as Amoco Superior Diesel Oil S-3, #158 Permalube All Purpose Grease, Amoco High Temperature Grease and other Amoco lubricants of exceptional quality.

For every lubrication job there's an Amoco lubricant that will do it better. That's why so many big coal stripping operations go Amoco *all the way!*

AMOCO LUBRICANTS

AMOCO®

Higher Quality... for Better Lubrication... at Lower Cost.

This Month in Coal Age

CONTINUED

► Overseas

Coal in Poland ..... p 80

Jerzy Dzierzynski, Director, Planning Office for Fuels and Power, Polish People's Republic

Increasing mechanization in existing mines and the opening of new pits in the Polish coal basins means more coal for home consumption and a surplus for export. Poland is second to the United States in per capita production, and fourth in wealth of coal reserves. Mining conditions are difficult, and post-war rehabilitation of the mines was a big job.

Sidelights: Statistical tables showing production, and seam characteristics.

► Industry Meetings

Spring Meetings Roundup ..... p 83

Highlights of a number of late Spring industry meetings, including National Coal Association, Central Appalachian Section—AIME, West Virginia Coal Mining Institute, Mine Inspectors' Institute of America and Coal Exporters Association of the United States.

Editorials ..... p 49

The Coal Commentator ..... p 12

Better fine-coal screening, Europe's energy supply for the future, Penn Machine and General Electric go down the line with coal, underground cleaning may return, Glenn Southward's contributions to mine mechanization.

Foremen's Forum ..... p 98

Getting the most out of your experience will help you become an even better supervisor.

Operating Ideas ..... p 102

Redesigned gear case cuts maintenance costs; chain conveyor empties low-cost bin; pivoted rack eases panelboard rebuilding; heated shanty dries boots; mirrors and pushbutton simplify truck loading; new fingerboard cuts controller downtime.

Equipment News ..... p 106

Latest models of a 26-in high loading machine, a 29-in continuous miner, a 4.5-tpm miner with 21-in sump, a 33½-in high shuttle car, and for heavy-duty haulage, a 27-cu yd truck powered by a 600-hp engine.

News Roundup ..... p 136

Railroads assert their right to a 6% return on investment; legislative snags waylay natural gas bill; clamor for atomic power ignores reality; 88 mine supervisors win safety awards; Union Pacific Coal Co. plans synthetic fuels plant; Europe's record production holder is France's Merlebach mine.

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The Coal Commentator

Finer Still

If the volume of discussion is any indicator—as it is in this instance—one of the major interests of coal men today is fine-coal reclamation and treatment, and water handling. There are good reasons. First, this fine coal now represents real value and the cost of recovering and preparing it normally is well under the money it brings in. Second, and in effect disposing of two birds with one rock, water cleanup and coal recovery put the plant in conformance with stream-pollution regulations.

The emphasis on fine coal, however, has brought in the problem of size classification, which in turn has meant that coal now is taking over certain machines from the metal and nonmetallic industries. It also has resulted in increased attention to the problem of fine screening. Now, as a further result, improvements in screens and in screen cloth permit efficient separation at meshes formerly considered impossible or impracticable.

Thus, in ultra-fine screening, coal has a new tool which undoubtedly will prove of increasing use as time goes by and the principles and practices resulting from such screening are more widely applied.

Fuel for Europe

Where Europe will get its energy in the years ahead is a problem still engrossing the attention of a fair share of its citizens—and there is little likelihood that the emphasis on fuel supplies will be any less in the near future. Great Britain, as an example, is now pinning its hopes on building up a major nuclear-power industry, but still is looking to coal for a major portion of its energy supply for some time to come. One reflection of this attitude is the stress on underground gasification of coal, which is being looked to not only as a means of recovering energy from seams difficult to mine but as a means of getting complete recovery in normal seams.

The picture on the Continent is basically the same but presents some differences. The six-nation Euratom group has set a goal of 15 million kw of nuclear generating capacity by 1967. In this development period they expect that nuclear electricity costs will drop from 11 to 14 mills per kilowatt-hour to 8 to 11. At present, the coal of coal and oil-generated electricity is estimated at 11 to 12 mills, and will increase a mill or so.

Pending the construction of this nuclear generating capacity, Euratom expects a steady rise in imports of energy to the equivalent of 160 million tons of coal by 1967, with a levelling-off period thereafter but no decline for at least a while. **United States coal undoubtedly will be a major item in this import total.**

Faith Into Works

The manufacturer who sticks with coal through the rough times as well as the good merits a little extra pat on the back. There are many of them and they could elect to serve other industries. So it is a pleasure to report on examples of manufacturer faith in coal and note again that the manufacturing fraternity's contributions have meant much to coal progress.

This month there are two examples of faith translated into works: Penn Machine Co., of Johnstown, Pa., and the Metallurgical Products Dept. of General Electric, Detroit. Penn Machine backed up its faith in coal by expenditures of $125,000 in 1955 and $200,000 in 1956 for improvements, with more being laid out in 1957. G.E. brings the coal industry a tidy bonus in the form of price reductions on cemented-carbide mining tools ranging up to 13%. The reductions reflect design changes and automated techniques to cut manufacturing cost, combined with a new packaging and shipping procedure.

Penn Machine and General Electric stand as two members of that great group of manufacturers and suppliers whose contributions have speeded up coal's progress. Orchids to them all.

Clean Underground?

Preparation, including cleaning, normally is thought of as a surface operation. However, it was not always completely so, since the miner customarily threw out the large impurities in the original hand-loading era.

Is it possible that coal could go back to that principle of cleaning in the mine—with a difference? Old timers will recall that Billy Burnett, of Peabody fame, was always asking "Why bring refuse out? Why not take it out underground and send out only the clean coal?"

If the pipeline—as well it might—should find application underground, the case for cleaning in the mine, and for pumping the refuse into old works, would be strengthened. Even without the pipeline, the question might make an interesting research project.

Glenn B. Southward

The retirement of Glenn B. Southward from the post of mechanization engineer for the American Mining Congress marks the end of a long career of effective service to the coal-mining industry, and to the metal and nonmetallic mining industries as well. His 30 years with the Congress span most of the era of initial application and final acceptance of the principle of machine mining. His contributions to the advancement of the art, however, were evident even earlier and set the stage for his life's work. Many of the standards and practices which coal now accepts as commonplace were hammered out with his guidance, inspiration and assistance, and thus industry operations will long bear his mark.

It is easy, therefore, to say: "Well done, Glenn Southward, and all the best for a long and happy future!"

Make Big Stripper Bucket Loads BIGGER . . .
Swing A Bucyrus-Erie New-Design Bucket

A 14-cu. yd., medium-duty, new-design Bucyrus-Erie bucket is swung on the 215-ft. boom of a 650-B. Approximately 50 feet of overburden is being stripped to uncover a 6-ft. vein of coal.

Bucyrus-Erie new-design buckets *load fast.* Their weight is concentrated to help teeth, cutting edge and thin "slicing-action" lip penetrate swiftly. Material flows in easily because the basket is properly tapered. Buckets *carry smoothly* because they are properly flared and balanced to hold down bobbing and spillage. High arch and smooth inside design assure *clean dumping.*

Armored with BECOLOY

Equally important, use of BECOLOY gives buckets exceptional impact and shock resistance as well as hardness to resist wear. Exclusive with Bucyrus-Erie, BECOLOY has a tough fibrous structure, is readily cut with an acetylene torch and welded without special procedures.

A new-design Bucyrus-Erie bucket can help you improve the efficiency of your stripping operation. You can choose from a wide range of sizes . . . for light, medium or heavy duty . . . with solid or perforated baskets. Your Bucyrus-Erie distributor will gladly make recommendations that can make *your* big stripper bucket loads *bigger.*

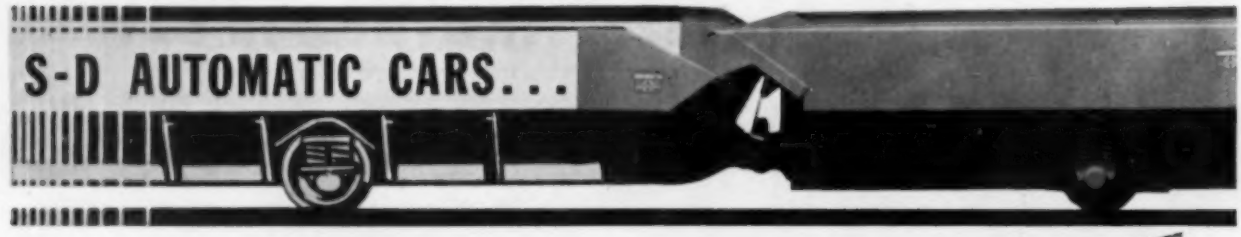
26R57C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

Another mine car development by Sanford-Day...

S-D AUTOMATIC CARS...



TWIN LATCHES FOR SAFE AND SURE LATCHING

With S-D "Twin Safety Latches" your bottom dumping car doors are actually padlocked twice. They are tripped independently by a pair of tripping devices mounted between rails.

SAFETY SEALED AGAINST DUST LEAKAGE

Cross-sectional view at right points out how flares extend over doors when closed, sealing material in car.

1/4 to 1/2 TON MORE CAPACITY

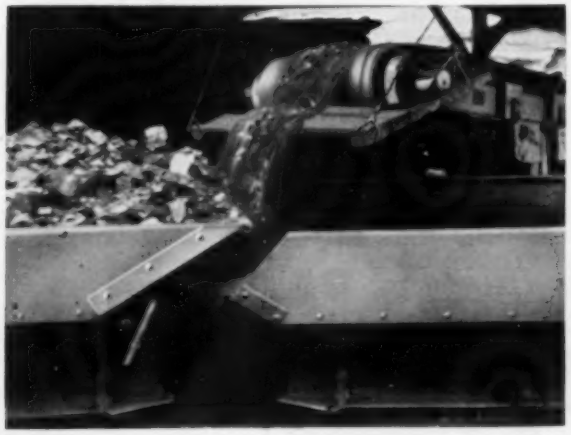
If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You save two cars in every 16 . . . 12½ percent in original investment . . . 12½ percent in maintenance . . . 12½ percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how the construction features of Sanford-Day's exclusive bottom dumping car design give you this extra capacity. Assure yourself of the maximum economies bottom dumping cars offer you by buying S-D Automatics!

Now available in S-D Automatics only 32" high!

To meet today's mechanization trends the S-D "Automatic" bottom dumping mine car with *overlapping ends* provides the ideal, practical answer to the question, "How can we obtain continuous loading of trips at loading points?"

In addition to others and the S-D "Automatic" illustrated, we recently manufactured and shipped to a Kentucky mining company the same design car, but only 32" high, 6'8" in width, 19' center-to-center of couplers and having an inside body length of 16'. In addition to *overlapping ends*, you also obtain in S-D "Automatics," and only in S-D "Automatics": 1 — "Twin Safety Latches" for safe and sure latching . . . 2 — Cars that are Safety Sealed against dust leakage, and 3 — ¼ to ½ ton more capacity per car for the same overall dimensions! Write us today for complete information! *Sanford-Day Iron Works, Inc., Knoxville, Tennessee.*

Pictured below is a trip of S-D "Automatics" with Overlapping Ends in actual operation. The car above (and further illustrated at right and left) is one recently ordered by a large company. It is 7' in width, 44" high, 20' center-to-center of couplers with an inside body length of 16½ feet. It further features spring mounted trucks and automatic couplers.



SANFORD-DAY

Knoxville, Tennessee

SCANDURA

Gold Line for Coal Mining

Tough • Strong • Fire Resistant

"THE BEST OF THEM ALL"

Acceptance designation "Fire-Resistant, U.S.B.M. No. 28-1" has been assigned to this belt.

More and more mines are using and reordering SCANDURA because:

Exclusive Distributors for the Mining Industry East of the Mississippi

National Mine Service Company

GOLD LINE is completely Fire-Resistant

GOLD LINE uses mildew inhibitors and rot proof Nylon to assure *double* mildew and moisture protection

GOLD LINE resists abrasion and cover stripping better than conventional belting

GOLD LINE easily absorbs shock loads and impacts

GOLD LINE has a tensile strength substantially higher than conventional five ply belts.

Suite 564, Alcoa Building, Pittsburgh 19, Pa.

All-State Div., Logan, W. Va. • Whiteman Div., Indiana, Pa. Morgantown, W. Va. • Ky.-Va. Div., Jenkins, Ky. • Western Ky. Div., Madisonville, Ky. • Ashland Div., Ashland, Ky. Anthracite Div., Forty Fort, Pa. • Bemeco Div., Beckley, W. Va. Clarkson Div., Nashville, Ill.

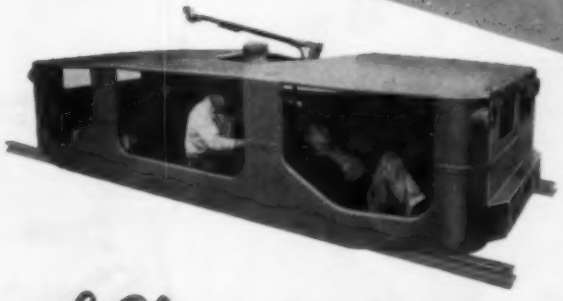
SCANDINAVIA BELTING COMPANY,

Newark 1, N. J. PLANT: Charlotte, N. C.

Time is Money - SAVE IT

with the **Lee-Norse BUS & JITNEY**

Take a real good look at these LEE-NORSE "TIME-SAVERS"! Like modern misers they hoard minutes into extra productive hours by cutting portal to portal time—reducing costs—increasing tonnage output.



Lee-Norse MINE PORTAL BUS

(Locomotive Type)

This self-propelled Portal Bus for hauling section production crews to and from the face is unique with its split roof construction giving the driver an unimpeded, all directional view . . . the trolley is always within easy reach of the operator. Our standard low and high type Portal Bus operates in the majority of coal mines and will haul from 13 to 20 Men. This Portal Bus is powered with one (1) large motor (15 H. P.) and has two (2) independent braking systems for complete safety — (airplane-type) disc brakes hydraulically operated on each axle and dual mechanical hand operated service brakes on each wheel.

TIME IS MONEY — SAVE IT with the Lee-Norse Mine Portal Bus!

Lee-Norse JITNEY

Wherever they're in use—they're regarded as a time saving asset. Fleet and versatile the Jitney furnishes quick, sure transportation to and from the working face for key personnel, inspectors, engineers, etc. When required the Jitney can be pressed into service as an ambulance and is suitable for pulling fire fighting equipment.

TIME IS MONEY — SAVE IT with the Lee-Norse Jitney.

Write NOW for Literature

Lee-Norse Company

CHARLEROI, PA.

DESIGNERS AND BUILDERS OF THE FAMOUS LEE-NORSE MINER

KOEHRING WORK CAPACITY *in action . . .*

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
20S CRAWLER	½-Yd.	20,000 lbs.	at 10-ft. radius
20S ON RUBBER	½-Yd.	30,000 lbs. 14,600 lbs.	at 12-ft. radius at 20-ft. radius
30S CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
30S ON RUBBER	¾-Yd.	30,000 lbs. 15,800 lbs.	at 10-ft. radius at 30-ft. radius
40S CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
44S ON RUBBER	(Crane only)	90,000 lbs. 40,000 lbs.	at 15 ft. radius at 25-ft. radius
60S CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
80S CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
120S CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? *See Koehring distributor.*

Solid footing on soft banks — Loading gravel off the bottom of a water-filled pit, Koehring 405 dragline (above) holds firmly to the edge of soft, loose banks. Stability of its extra-long, extra-wide crawlers shows up to good advantage in conditions like this. Extra stability means extra work-capacity, too. The heavy-duty 405 handles 1 to 1½ cubic-yard dragline or clamshell buckets on a wide work-radius — boom lengths range from 40 to 90 feet. Butt-connected boom is solid, safe. Inserts are easily changed. Check the 405's other work capacities (in chart) — then have Koehring distributor demonstrate what it will do on your lifting, loading, stripping, stockpiling.

Quarry rock — ¾-yard 305 loads out Lannon stone in a Mid-West quarry. It's a rugged rock shovel, with exceptional operating ease. Big 23-inch main-drum power clutch requires only 1/10th the lever-pull of a comparable-size manual clutch — yet, retains "feel" of load.

15-ton handyman — With its heavy lift capacity and high-speed mobility, Koehring 205 truck crane is a handy material-handling rig to have around. It unloads heavy equipment and supplies, installs machinery — converts to ½ to ¾-yd. clamshell or dragline, ½-yd. shovel, hoe.

Big stripper — Look at the work range of this big 1205 high-lift shovel. It digs up to a height of 42 ft.-10 in. at 45° boom angle — dumps at a height of 31 ft.-5 in. That's with a 3-yard dipper on 40-foot boom. *Need more reach?* It also takes a 2½-yard dipper on a 50-foot boom — has 51 ft.-4 in. cutting height, and 40 ft.-10 in. dumping height, at 45° angle! For heaviest digging, the standard 1205 has 3-yard dipper on 30-foot boom. On dragline or clamshell work, it handles 3 to 4-yard buckets on 60 to 170 feet of boom. *Want more facts?* See Koehring distributor for complete story on this big 1205. Call today.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.

ENGINEERING
REPORTS:
Powered by General Electric system . . .
New 55-cu. yd. stripper
RIVER QUEEN
GENERAL ELECTRIC

removes 5000 tons per hour

Huge Bucyrus-Erie shovel built for River Queen mine removes 90-foot overburden, has 55-second duty cycle

At River Queen mine in Western Kentucky, the largest power shovel ever built by Bucyrus-Erie Co. strips 90-foot overburden at a rate of more than 5000 tons per hour. Built for Peabody Coal Company and W. G. Duncan Coal Company, joint owners of the mine, the 55-cubic-yard "River Queen" makes possible the simultaneous recovery of two coal seams, separated by a five-foot rock parting.

For this immense project Peabody, which operates the mine, specified General Electric equipment for the shovel's electrical system. General Electric engineers worked together with Bucyrus-Erie and Peabody engineers to design and install the electrical system.

Highlights of the electrical system are nine rugged G-E direct-current motors to power hoist, swing and crowd motions; four 200-hp induction motors to power the propel motion; quick-response amplidyne*-amplistat** control system which permits one man operation; and a 3750-kva substation that is skid-mounted for mobility over rough mining terrain.

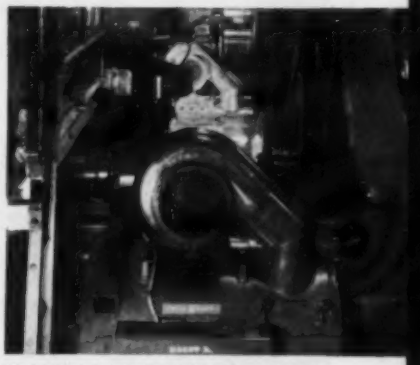
R. T. Taylor, Peabody electrical engineer, discussing the shovel's electrical system and performance, stated that Peabody has had excellent experience with G-E equipment in the past, and the equipment in the River Queen shovel has lived up to expectations.

In any phase of mining operation, G-E engineers and equipment can work for you. For information contact your local G-E Apparatus Sales Office or write General Electric Co., Section 663-47, Schenectady 5, N. Y.

*Amplidyne—rotating amplifier developed by General Electric Co.

**Amplistat—static amplifier developed by General Electric Co.

PROJECT PLANNERS include (l. to r.) R. M. McElwee, G-E sales engineer; R. T. Taylor, Peabody engineer; and J. E. Payne, Bucyrus-Erie field erection engineer.



HEAVY LOAD DEMANDS of hoist motion are met by four new General Electric MD-620 direct-current motors, rated 375-hp each.

Engineered Electrical Systems for the Mining Industry

GENERAL ELECTRIC

MAXIMUM direct-current output under heavy loads for River Queen shovel—up to 6000-hp—is provided by two General Electric synchronous motor-generator sets.

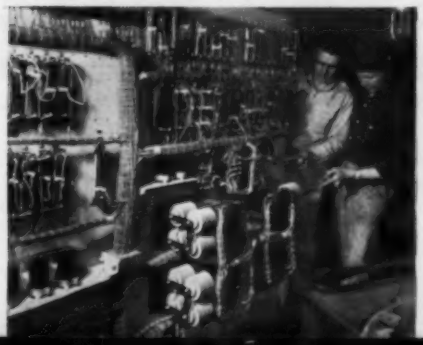
MOBILITY over rough mining terrain, obtained by a specially-constructed skid-mounted 3750-kva substation, places incoming power near shovel, minimizes voltage drop.

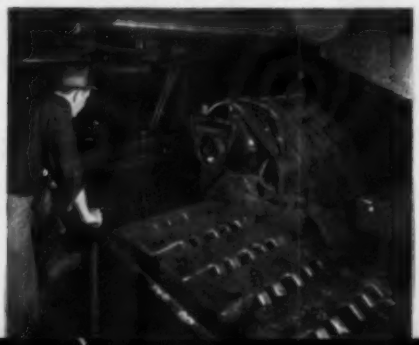
HEAVY DUTY swing motion is powered by three 187½-hp MD-616 General Electric direct-current armored motors, mounted vertically.

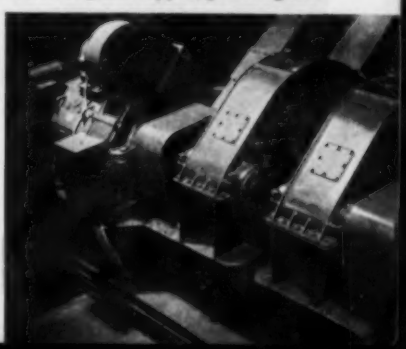
FAST RESPONSE and high-accuracy one-man control of River Queen shovel motors is provided by reliable General Electric amplidyne-amplistat electrical control system.

TRACTION POWER to propel massive, 2400-ton River Queen is supplied by four heavy-duty General Electric 200-hp wound-rotor induction motors (one shown).

HIGH TORQUE General Electric direct-current MD-616 motors, rated 187½-hp each, power crowd motion of giant dipper, give long life.







If you want to be sure
install Tiger Brand

Cable is pulled through the racks. Pulleys ease it through at each turn.

SINCE we've been making electrical cable at American Steel & Wire since 1891, customers often ask us how they can best plan for *future* wiring needs. They've seen the shocking cost of plant modernization programs in buildings that were not designed with foresight.

Electrically speaking, you're going to need a *flexible* wiring system, one that can be enlarged or revamped with ease. To lots of designers today, that means a feeder system that is *not* permanently sealed in rigid conduit, frequently buried under tons of concrete and, in case of damage, frequently unrepairable. All of these problems are solved when you install flexible Armorlokt in an open-rack system.

Initial installation is not difficult. Extra feeders can be added easily at any time. Special feature: Splices can be made *anywhere* along the cable's length. The pictures on these pages show how adaptable and flexible such a wiring system can be.

Tiger Brand Armorlokt is made in a complete range of sizes and constructions. Ask your AS&W salesman.

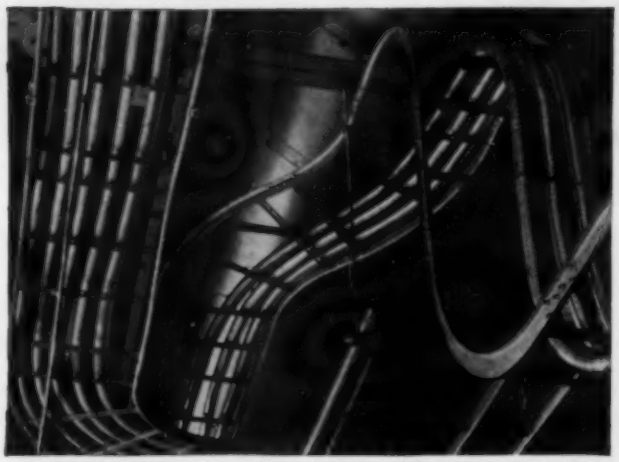
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Winch on truck does the pulling. Crew members talk to each other with telephones.

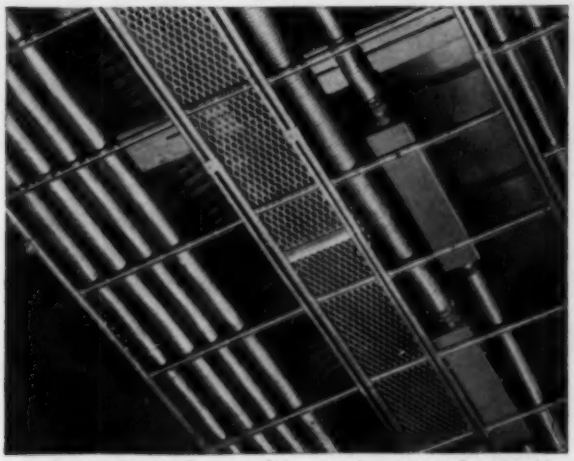
# of adequate wiring in 1977,
Armorlokt now!

Armorlokt terminates easily. Flexibility of the cable eliminates fussy joint work.

Small radius or large radius curves are easily handled. Space is left for future cable.



Imagine how this would look using old-style conduit. Now it's neat and accessible.



Splices can be made anywhere, an important feature if cable is damaged in service.

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- ASBESTOS WIRE AND CABLE
- MOLD CURED PORTABLE CORD
- SHOVEL & DREDGE CABLE
- PAPER & LEAD CABLE
- VARNISHED CAMBRIC CABLE
- INTERLOCKED ARMOR CABLE
- SPECIAL PURPOSE WIRE & CABLE
- AERIAL, UNDERGROUND AND SUBMARINE CABLE

USS

UNITED STATES STEEL

For More Profitable

21782

Goodman Continuous Borer

This rugged, powerful machine has all the capacity, power and maneuverability for entry development, room work, and pillar recovery. With an 8-man crew, including roof bolters, mechanic and foreman it has produced a tons-per-man average as high as 155.3. For a full six-months period it has averaged 724.97 tons per shift with a tons-per-man average of 90.62. At still another mine it consistently produced an average of 861.3 tons per shift, or 123 tons per man, and at the same time reduced face cost per ton to ½ that for conventional mining. This reduced cost included labor and maintenance as well as materials such as roof bolt supplies, rock dust, bits, oil, grease—and after mining over 500,000 tons of coal in steady service the machine has not yet been scheduled for a major overhaul.

The Goodman Continuous Borer is the most consistent high tonnage producing machine on the market today and at every installation has raised the working face efficiency level. It promotes true concentrated working areas requiring fewer man-hours and less supervision. It eliminates hazards associated with drilling and blasting, by cutting an arched path for natural roof support, by advancing rapidly so that rooms are kept open but a short time thus reducing possibilities of roof deterioration. Maintenance cost is low because of simple design featuring large parts and a minimum of moving parts.

The Goodman Borer is an investment that can be written off in terms of greater productivity and lower cost per ton in a surprisingly short period of time.

Goodman Extensible Conveyor—ROPEX®

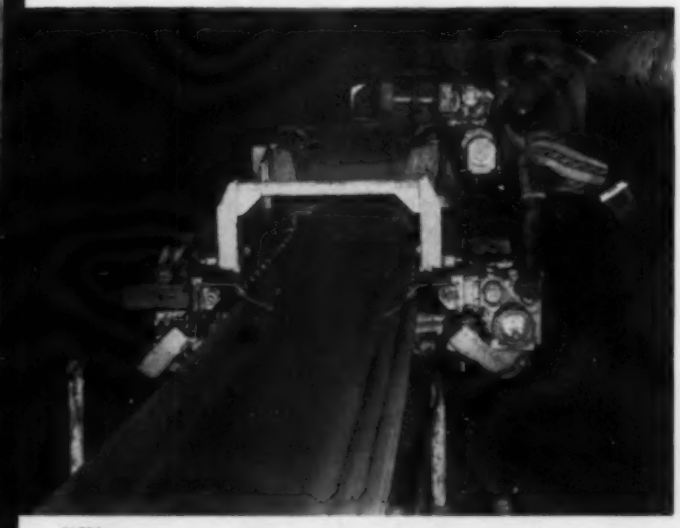
Here's a 36″ width belt conveyor that increases or shortens its own length, under its own power, while running coal. Linked to any continuous miner or loader it keeps pace with the face. It eliminates delays and interruptions providing a continuous flow of coal to the out-of-the-mine transportation system. It provides for as much as 200 feet of belt storage for 100 feet of advance before adding belt. Along the line Ropex has no heavy structural framing, no rigid idler assemblies. The belt rides on linked idlers suspended between parallel wire ropes anchored to the head

Patents issued or pending on all machinery illustrated

® Registered Trade-mark

Continuous Mining

section and payed off storage drums on the tail section. Coal moves fast, smoothly and evenly from tail to head with no jolts or bumps to cause shifting or spilling. During extension (1,000′ max.) or retraction, loaded or unloaded, predetermined tension on belt and wire ropes is automatically maintained. Motor driven bridge conveyor between tail section and loading equipment swivels to right or left, has 13½′ range of forward and back travel. And here's another advantage of Ropex—the discharge height at head can be adjusted. There's no need of cribbing or support.



21784

Tread mounted tail section of Ropex bridge connected to a Goodman Continuous Borer. It's always in position to accept load and keep it moving.

Open construction of belt storage framework at tread mounted head section of Ropex. Belt is easy to add, can always be inspected.

21787

21556

Goodman Rope Belt Conveyor

The most useful conveyor you can buy—it's practical anywhere in a mine for any type of service. By eliminating almost everything but the belt itself and the terminal units hours have been chopped off installation and extension time. For example, the Rope Belt can be extended 150 feet in less than one hour between shifts, with no loss in production time, and all necessary parts can be hauled in one mine car or shuttle car. As for carrying capacity the Rope Belt can't be beat. Hinged action of the linked idlers and spring action of the wire ropes "cup" the belt to the load, light or heavy, providing shock-free travel without shifting or spillage. The minimizing of shock also means less wear on belt and idlers, fewer repairs, infrequent replacement. And here are some other advantages to consider: cost of intermediate section of Goodman Rope Belt conveyor is as much as 50% less than for conventional type. Cost of belting can be less because lighter ply belt can frequently be used. Clean-up time along the conveyor is negligible.

Cost savings in all respects, coupled with operating advantages have been proved wherever Goodman Rope Belt conveyors have been installed. Why not investigate now?

The Goodman equipment described on these pages forms the nucleus of the modern successful continuous mining system. In addition, Goodman offers a complete line of machinery for profitable conventional mining in both high and low coal. Included are shuttle cars, mobile loaders, conveyors, cutting machines, locomotives, roof bolting equipment and wet rock-dusting units. And, of course, Goodman engineers are at your service without cost to you. We'll gladly supply full details about any of this equipment.

GOODMAN

MANUFACTURING COMPANY

Halsted Street and 48th Place, Chicago 9, Illinois

CUTTING MACHINES • CONVEYORS • LOADERS
SHUTTLE CARS • LOCOMOTIVES • CONTINUOUS MINERS

Use Genuine Goodman Replacement Parts

P&H Electric Shovels

Illustrated is a P&H 1600—6 cu. yd. Electric Shovel. This is the third P&H Electric Shovel purchased by Dewey Portland Cement Company and one of six P&H machines used at their Davenport plant.

give you 95% Availability

Reports of 95% availability by users of P&H Electric Shovels are not at all unusual. This typically outstanding P&H performance is the result of these exclusive P&H designed and manufactured features!

MAGNETORQUE* . . . the outstanding feature that transmits power from the hoist motor to the dipper electro-magnetically for faster action, eliminating shock and impact from the hoist gear train and motor. Swings are smoother and up to 5 percent faster.

ELECTRONIC CONTROLS . . . P&H designed and built to provide faster, coordinated cycles for consistently high output. Simplified design means lower maintenance.

P&H Basic Design . . . permits scientific weight distribution to insure maximum stability with higher bail pull. All-welded construction adds ruggedness and stability needed for the toughest jobs.

With P&H you get all of these exclusive electric shovel features . . . plus the advantage of single source responsibility. P&H designs, manufactures and applies all electric rotating equipment specifically for electric shovel service.

P&H ELECTRIC SHOVEL LINE: 3½ through 8 cu. yd. capacities.

HARNISCHFEGER
CONSTRUCTION & MINING DIVISION
Milwaukee 46, Wisconsin

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

"I sure go for Bethlehem Machine Bolts!
They're strong and tough, and come
in every size we need."

Spikes and track bolts, too!

BETHLEHEM STEEL

New from Standard Oil

RYKON

GREASE

Standard scores major breakthrough in grease technology to bring you better lubrication . . . help you make important savings in grease use, application and inventorying.

Scientists at Standard Oil have developed a new non-soap, organic, grease thickening agent. This, plus other improvements in grease formulation, is now available in a new line of Standard greases named RYKON.

Mechanical stability—RYKON Greases show little change in consistency even under severe working.

Oxidation stability—Exclusive thickener in RYKON Greases inhibits oxygen absorption. This prevents costly corrosive action on bearings.

Water resistance—Extremely resistant to water washout.

High temperature stability—RYKON Greases have an ASTM dropping point of 480° F. They have exceptional heat stability.

Resistance to change—RYKON Greases remain soft and grease-like at sustained high temperatures, continue to give thorough lubrication.

Low temperature stability—RYKON Greases work readily at low temperatures, lubricate from a cold start.

Oil separation—RYKON Greases exhibit strong resistance to bleeding.

Rust preventive properties—RYKON Greases demonstrate superior natural qualities in prevention of rust.

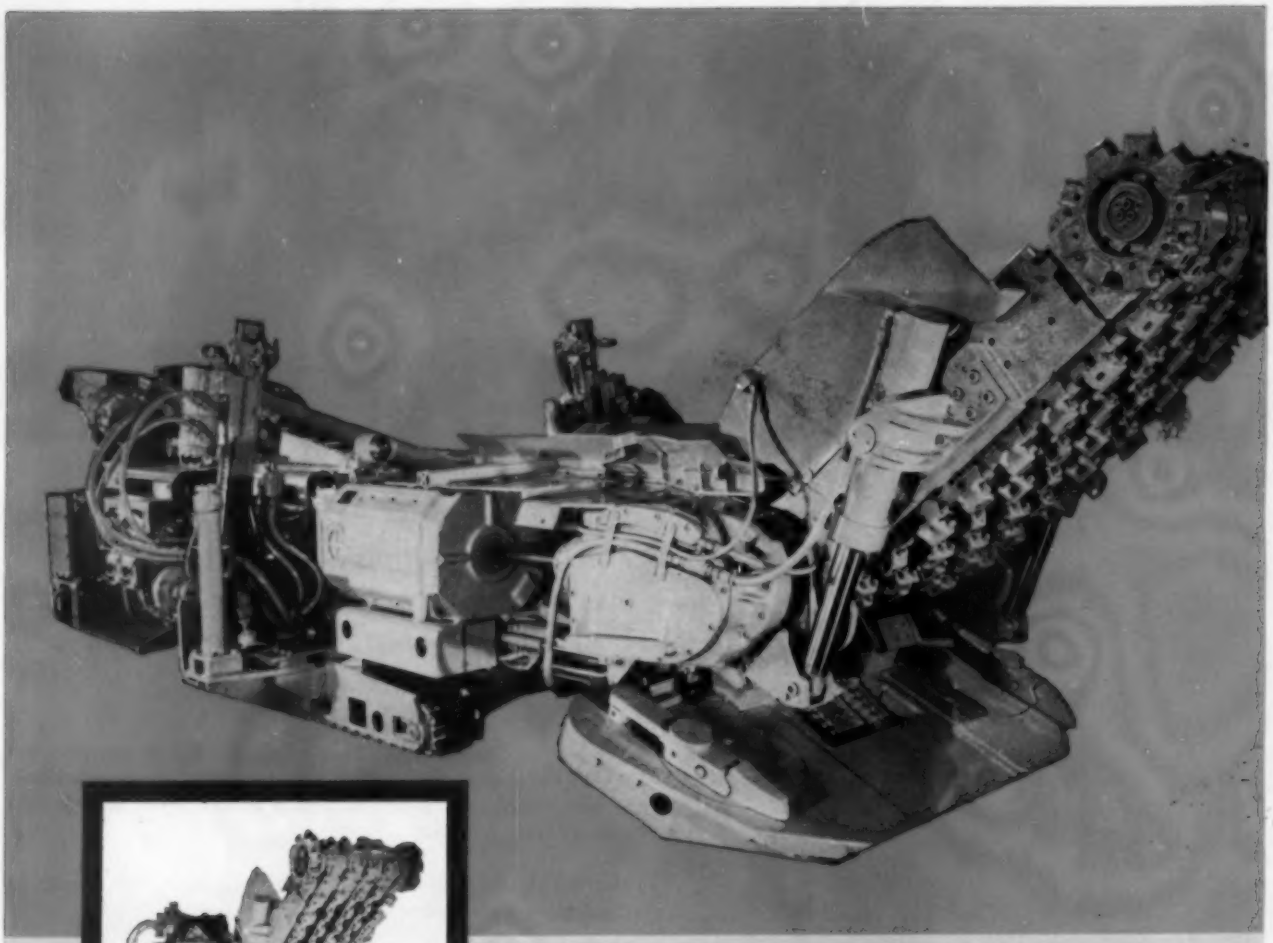
To meet specific grease lubrication problems, greases in four Regular and three Heavy Duty grades are available. With a single RYKON multi-purpose grease doing all jobs in the plant, there's no wrong grease to use. Money invested in grease inventories is cut, storage and application facilities are reduced. Maintenance training is simplified.

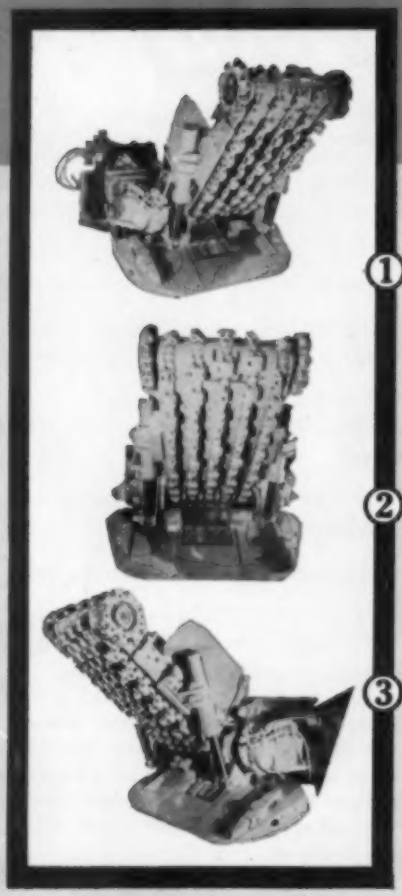
Get the facts about RYKON Greases from the industrial lubrication specialist at the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY

(Indiana)





1 GATHERING ARM CLEAN-UP

The rugged clean-up works on the same proven principle as Joy Loaders . . . speeds up pillar extraction. The operator can clean up old workings, rooms, and crosscuts . . . in an 18′ room, the miner can clean up the entire bottom to within 8″ of rib.

2 EXTRA LARGE RIPPER HEAD

The 42″ wide ripper head with extra deep sump (increased to 21″) results in greatly increased tonnages. The new head also results in more ripped coal and less fine coal.

3 DIRECT ACTING SHEAR JACKS

More powerful shear jacks easily maneuver the extra large ripper head. These jacks eliminate chains and linkages; reduce maintenance. Jacks are inverted . . . keeps dust from cylinders.

25% Higher Tonnage

The New JOY 1CM-3 Miner

Produces 4½ Tons Per Minute

THESE

NEW FEATURES

MAKE IT POSSIBLE

- 21" SUMP
- GATHERING ARM CLEAN-UP
- 42" WIDE RIPPER HEAD
- DIRECT ACTING SHEAR JACKS
- INCREASED POWER
  250 HP STANDARD
  276 HP WITH ROOF DRILLS
  286 HP WITH DUST COLLECTORS FOR ROOF DRILLS

WRITE FOR BULLETIN 182-1

The new Joy 1CM-3 is a 47" high continuous miner for driving entries, mining rooms and extracting pillars, in seams 60" and higher. It is an entirely new machine with every new feature engineered into it as a result of Joy's long experience in the continuous miner field. It has the power to produce up to 4½ tons per minute.

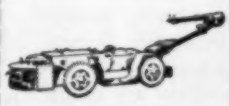
Less time is involved in clean-up operations because of a completely new clean-up design that works on the gathering-arm principle. The new clean-up handles draw slate and old workings.

Find out how the new 1CM-3 will fit into your operations . . . write *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

JOY EQUIPMENT FOR MINING . . . FOR ALL INDUSTRY

CONTINUOUS MINERS

LOADERS



DRILLS

CUTTERS

WSW CL 6062-182

Carbon steel formerly used in this Simplicity aggregate drier wore out from smashing impact after handling 1¼ million tons of crushed dolomite but life expectancy is now over 4 million tons. Drier operates in one of the plants of The J. E. Baker Co.

Lukens "T-1" steel triples life of rock drier

TRADEMARK

Are impact and abrasion shortening the life and rocketing the costs of your equipment? If so, there's a lesson here for you:

When the liner shell and partition plates of this 10 x 20 foot Simplicity aggregate drier were replaced with Lukens "T-1" steel, life expectancy increased threefold!

Whether you handle stone, coal, or metal ores, it will pay you to investigate Lukens "T-1" steel for surfaces hard-hit by impact and abrasion. The 321 minimum Brinell quality has been known to outlast ordinary steels by 18 to 1. Applications are many throughout the materials handling and processing industries. Wear plates, chutes, hoppers, and mine cars are typical.

The remarkable combination of hardness and toughness in this high yield strength, readily welded alloy steel is even maintained at temperatures well below zero. *Send for informative illustrated booklet, "Lukens 'T-1' Steel." Write Manager, Marketing Service, Room 902 Lukens Steel Company, Coatesville, Pennsylvania.*

LUKENS

Helping industry choose steels that fit the job

NEW, SELF-FUSING, WEATHER-RESISTANT SPLICING TAPE

FOR RUBBER AND PLASTIC CABLES

OKOWELD—an entirely new tape designed for use on rubber or plastic insulated cables . . . provides *one-tape* splices and terminations for service up to 2000 volts . . . mechanically tough . . . resistant to weather and moisture . . . flame-resistant . . . easy to apply . . . available in five colors for color-coding of splices . . . made from a new, self-fusing compound developed by the Okonite Research Laboratories.

TYPICAL USES—For *one-tape* terminating and splicing of service drop cables . . . portable cords and cables . . . power and lighting circuits . . . control cables . . . bus bars . . . communication cables.

SPLICED-FOR-LIFE FEATURES

Self-fusing	forms solid moisture sealing wall
Abrasion-resistant	approved by Underwriters' Laboratories
Compression-resistant	approved by Underwriters' Laboratories
Flame-resistant	passes Bureau of Mines Flame-Resistance Test
Splice aging	properties improve with age
Shelf life	one year guarantee

ONE TAPE—MANY USES—Compatible with all cable insulations and sheaths . . . polyethylene . . . PVC . . . natural rubber . . . GRS . . . butyl . . . neoprene. Use for:

Insulation and sheath	up to 2000 volts
Sheath over insulation	over 2000 volts
Color coding	available in Red, Blue, Green, Yellow and Black

STABLE IN SERVICE—Tested for more than two years in the laboratory, Okoweld shows excellent resistance to weather . . . ozone . . . chemicals . . . oils . . . hydrocarbons . . . moisture . . . mechanical damage.

EASY TO APPLY

Temperature range	handles well in hot or cold weather
Conformability	molds to irregular shapes
Cohesiveness	all surfaces bond permanently

U L APPROVED—Only self-fusing tape approved by Underwriters' Laboratories as "...the sole insulation and covering of joints and splices in electrical conductors."

Sold exclusively through Okonite's Authorized Tape Distributors

OKONITE splicing tapes

FREE SAMPLE ROLL

It's yours if you'll just fill out this coupon and mail it to: The Okonite Company, Tape Dept., Passaic, New Jersey.

Name_____ Position_____

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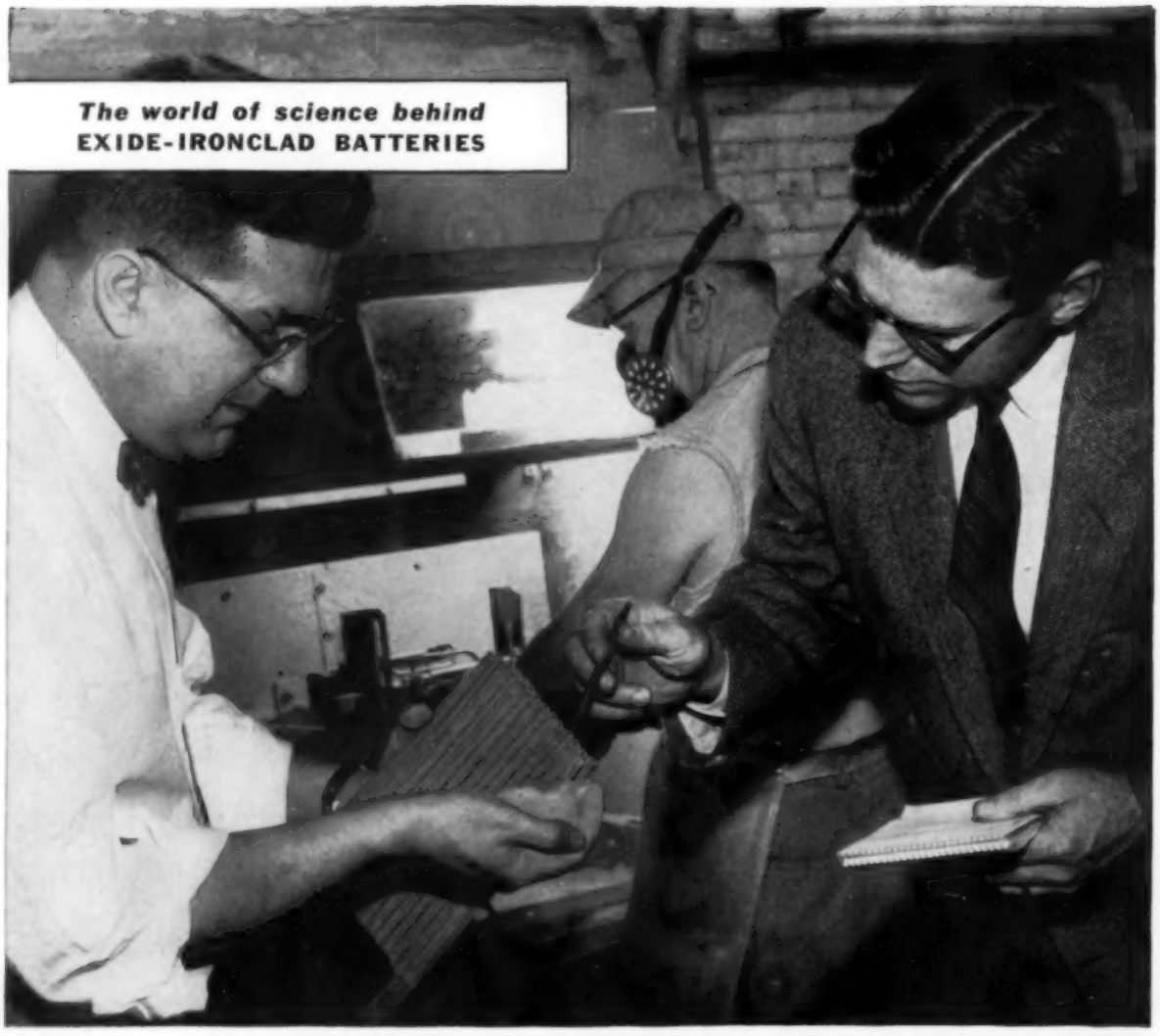

Being interviewed is E. A. Wagner, Product Engineer

"This oxide blend packs more power per ounce"

At the Exide Laboratories—**Reporter:** More power, Mr. Wagner? Do you mean the blend of oxides in Exide-Ironclad is different from that used in other batteries?

Wagner: Absolutely. We can use the more active oxides that give the batteries higher capacity.

Reporter: Why do you say *can?* Can't other batteries use these oxides too?

Wagner: It isn't likely. First, this blend is the result of more than 40 years of Exide research—and it's an Exide exclusive. Second, we can use it successfully because of the unique tubular construction of the Exide-Ironclad positive plate.

Reporter: How does tubular construction help make it a better battery?

Wagner: Because the cylindrical power tubes hold the tiny oxide particles firmly in electrical contact clear through the charge and discharge cycle. So Exide-Ironclad Batteries can maintain their high capacity—even under severe vibration—for years of service.

Reporter: Obviously, this is an important feature of Exide-Ironclad Batteries.

Wagner: Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

Note to battery users. Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Phila. 2, Pa.

THE ELECTRIC STORAGE BATTERY COMPANY Exide®

65 belt hp!
up to 15,500 lb drawbar pull!
forward speeds from 1.5 to 5.5 mph!
reverse to 4.1 mph!

ALLIS-CHALMERS

HD-6

Tractor-Dozer

MORE POWER—BETTER DOZING SPEEDS—BIG-DOZER DESIGN—NEW HANDLING EASE!

Only dozer of its size with these basic advantages . . . engine-mounted rams, long push beams, fewer linkage points (only 2 instead of 5 or 6). These big-dozer features all combine to provide more accurate, gouge-free dozing . . . longer equipment life.

Convenient rotary-valve blade control makes the HD-6 the easiest handling dozer of its size. With more than 5½ feet of track on the ground, it has outstanding flotation . . . yet turns easily in any terrain. The HD-6 also combines large, low-set front idlers with a blade snugged close to the radiator guard . . . to provide balance that means better dozing, more work done under any conditions!

You can <u>see</u> it . . . but there's only one way to <u>prove</u> it—on **your** job!

Lifts 18 tons at a bite...

TIGER BRAND WIRE ROPE at work in the world's largest open pit mine where long service is the first requisite.

...works 24 hours a day

THERE'S NO REST for the Tiger Brand Wire Rope on this big shovel. It works continuously during the iron ore season and is subject to heavy loads, abrasion and fatigue.

Not all shovel ropes are suitable for all service requirements. Shovels vary as well as digging conditions. Therefore, shovel ropes must possess greater strength, greater abrasion and fatigue resistance. Tiger Brand Wire Rope is designed specially for these applications to give the best possible service.

To help you select the best wire rope for your equipment, call in the Tiger Brand Wire Rope Specialist. He can frequently save you money by recommending a better rope for the job.

AMERICAN STEEL & WIRE DIVISION
United States Steel, General Offices: Cleveland, Ohio
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

USS

UNITED STATES STEEL

You can see it, but there's only one way to prove what the HD-6 can do for you!

Call your nearby Allis-Chalmers construction machinery dealer —he'll demonstrate one on your job NOW!

. . . or send us this

Allis-Chalmers
Construction Machinery Division
Milwaukee 1, Wisconsin

Gentlemen:

Please have the Allis-Chalmers construction machinery dealer serving my area arrange a demonstration of the HD-6 tractor-dozer for me.

Name_____

Address_____

City_____ State_____

Type of Work_____

Fletcher Roof Bolting Machine

Styles SS and TT Bit in 1-1/2" diameter only available with white shanks for easy identification of "starter" bits

Carmet roof drills

ARE ENGINEERED FOR FAST, RUGGED DRILLING

One look at the sturdy construction of Carmet roof bits and you can see why they consistently drill clean, accurate holes . . . even in the hardest strata. They're built to withstand the stresses of the heaviest roof bolting machinery. They're designed for fast penetration at lower feed pressure.

Notice, for instance, the heavy steel backing of the shank at the cutting tip. This permits the use of a superior, more wear resistant grade of carbide for maximum tool life. It prevents premature "massive" carbide fracture which often accounts for up to 50% of total bit cost.

That extra carbide wear length along the outside cutting edge helps you to maintain proper hole gage through the life of the tool . . . you get more holes per regrind and more regrinds per bit. These are just a few of the Carmet "extras" that add up to all around lower drilling costs per ton.

Call your Carmet distributor for a demonstration of the cost cutting advantages of Carmet roof drills. He'll be glad to assist you in setting up a tool program to suit your operations. ***Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Mich.***

CARMET DISTRIBUTORS

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Offices: Buffalo, Rochester & Syracuse, N.Y.
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Carlsbad Supply Co., Carlsbad, New Mexico
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Union Supply Co., Denver, Colorado
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W. B. Thompson Co., Iron Mountain, Michigan

Write for your copy of the CARMET MINING TOOL CATALOG and METHODS MANUAL

Illustrates full line of Carmet mining bits . . . giving tool dimensions, rake and clearance angles, etc. Specifies grinding wheels and procedures for reconditioning tool bits.

ADDRESS DEPT. CA-91

The Original DOUBLE-BONDED Carbide Bit

CARMET®

REVELATION AIR HOSE . . . for heavy-duty service—extremely flexible, defies abuse, weather and abrasion.

PYROPRENE BELTING*. . . fire resistant . . . oil resistant . . . mildew proof.

*Acceptance designation: "Fire Resistant, U. S. B. M. No. 28-7" January 27, 1956

OVER 87 YEARS OF SERVICE TO INDUSTRY

Write today for more information, and literature.

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MANUFACTURING CORPORATION • Trenton 3, N. J.

A Division of Acme-Hamilton Manufacturing Corporation

ATLANTA, CHICAGO, HOUSTON, PITTSBURGH, INDIANAPOLIS, LOS ANGELES, NEW YORK, SAN FRANCISCO

CUT FUEL USE 75%

Since he switched to GM Detroit Diesel Power

More work on less fuel. That's a two-way combination that spells more profitable mining for any operator. And that's what Peerless Coal & Coke Co. got by switching from gasoline to General Motors Detroit Diesel power.

E. H. Colvard, Tipple Supt. for Peerless, reports this repowered locomotive now moves 45 to 70 cars per day from mine to railroad—using less than one gallon of low-cost Diesel fuel per hour compared to four gallons of gasoline per hour with the former engine. Fuel savings paid for the Diesel in two years! With GM 2-cycle Diesel power, the unit easily pulls two loaded cars, starts quickly in cold weather, requires less maintenance.

Thinking of buying or repowering equipment? You'll be money ahead with GM Detroit Diesel. Single engines 30 to 300 H.P., multiple units up to 893 H.P. Ask your distributor or dealer—or write for more information.

DETROIT DIESEL

GM GENERAL MOTORS DETROIT DIESEL POWER

Engine Division of General Motors
Detroit 28, Michigan

REGIONAL OFFICES: New York, Atlanta, Detroit, Chicago, Dallas, San Francisco

Factory Engineered Parts—Factory Trained Servicemen Everywhere

1929 Whitcomb locomotive repowered by GM "4-71" Diesel, owned by Peerless Coal & Coke Co., Vivian, W. Va.

Latest Stoper Drill Development Simplifies Roof Bolting in Low Coal

Le Roi-Cleveland S-20 Vac-Nu-Matic stoper, with new feed principle, is only practical machine in seams from 36" down to 26". Other sizes available for any seam height.

28-inch feed S-20 weighs only 65 pounds. It is the lightest dust-collecting type stoper available—operators say it's easier to use.

The revolutionary S-20 stoper is designed especially to provide a better way of producing roof-bolt holes.

Low coal or high coal makes no difference to this machine. It lets you put your roof-bolts wherever you need them — even in 26-inch coal. And high drilling speed along with light weight and a positive dust-collection system helps your miners get the work done faster.

New feed principle provides low overall height and longer travel. The S-20's feed consists of an air piston combined with a chain in such a way that the travel of the machine is double the travel of the feed piston. As a result, it drills a deeper hole with one steel change than a standard stoper does with two changes.

Because it does away with at least one steel change and in some cases two, this longer travel saves roof-bolting time.

The low overall height is obtained because the S-20 is the only stoper that starts its feed at the bottom of the machine. The starting height, regardless of feed length, is always 16½ inches.

Dust collection is instantaneous. There are no hoods or tubes to handle or adjust, when your miners use the S-20 Stoper. The cuttings and dust are pulled through the drill steel instantaneously and ejected through the side of the chuck housing into the dust box—no cuttings go through the machine itself.

There's complete absence of dust because the S-20 system pulls a high vacuum. It uses only 18 cu. ft. of air at 80 lbs. pressure to pull a static vacuum of 16½ inches of mercury or a fluid vacuum of 13 inches while the machine is running. Wet top presents no problem.

New design speeds roof-bolting operation. The S-20 has been in the field for more than a year, working in all types of coal mines. According to the evidence piled up during this period, S-20 users not only roof-bolt areas heretofore impossible to get at — they also do the work faster.

Features that contribute to this increase in efficiency are: Lighter weight. Low overall height. Longer feed. Positive dust-collection. Fast drilling speed.

Test the S-20 in your mine. See how it reduces roof-bolting costs. A demonstration can be arranged by contacting Schroeder Brothers, 3116 Penn Ave., Pittsburgh, Pa.; Acme Machinery Co., Williamson, West Virginia; Equipment Service Co., Inc., 617 North 9th St., Birmingham, Alabama. Or, you can contact us direct.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products.

ANNOU

Increased capacity ratings

THE Timken Roller Bearing Company announces an increase in the capacity ratings of most series of Timken® tapered roller bearings. Increases range up to 39%. Most are in the neighborhood of 10%. Some are negligible.

Permits Use of Smaller Bearings

This increase in capacity ratings makes it possible for many of you to use smaller bearings. Your products can be made more compact. You can save weight. You may be able to reduce the size of your shafts and housings. And you may be able to use Timken bearings in new applications where they have not been practicable in the past.

3 Reasons for Increases

What led to these increases in Timken bearing capacities? Three things: First, a careful review of more than 6,000 different laboratory studies

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

NCING!

for Timken® bearings

of Timken bearing performance on fatigue life machines. From these exhaustive studies, conducted on an organized, scientific basis since 1924, we keep learning more and more about predicting bearing life.

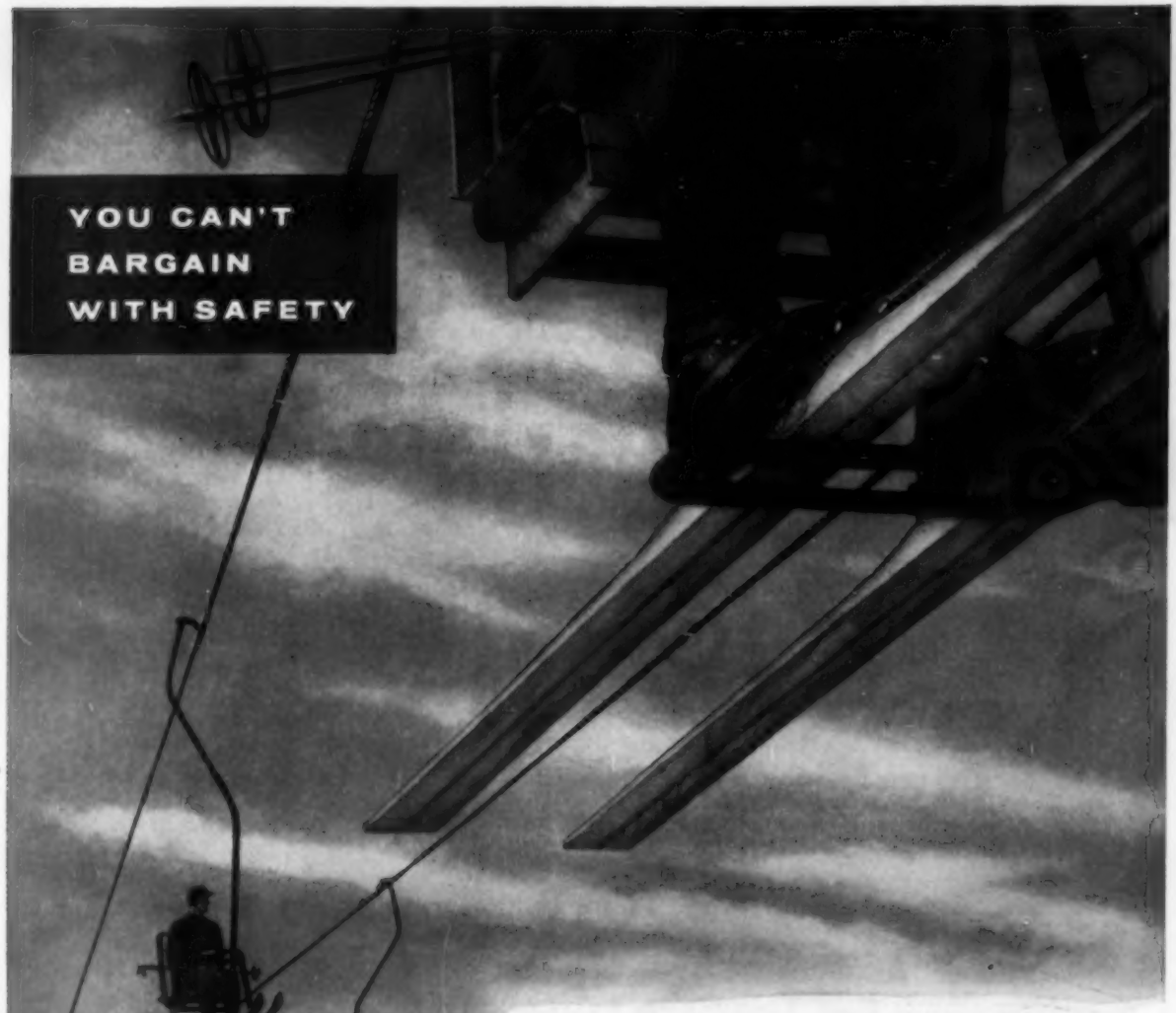
Second, refinement in the method of analyzing these studies mathematically.

Third, a careful review of the life of millions of Timken bearings in the field.

How Much Can This Save *YOU?*

To find out how the new capacity ratings affect the types and sizes of Timken bearings in which you are interested, call your Timken bearing representative or write our Engineering Department. We'll be glad to work with you at the drawing board stage. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TAPERED ROLLER BEARINGS ROLL THE LOAD



Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

WICKWIRE ROPE
A CF&I PRODUCT

CF&I

LOOK FOR THE **YELLOW** *TRIANGLE*

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

5050

THE COLORADO FUEL AND IRON CORPORATION — Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
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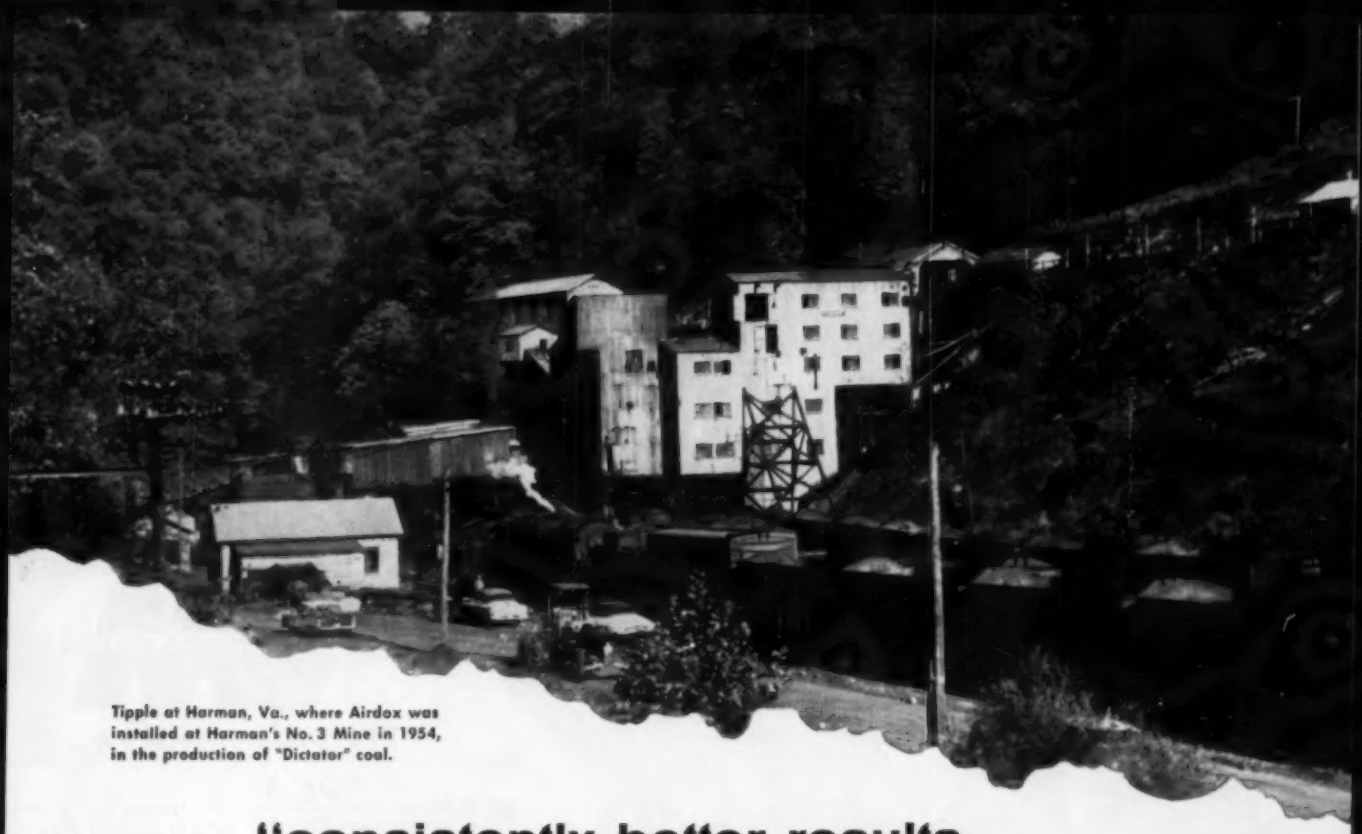

Tipple at Harman, Va., where Airdox was installed at Harman's No. 3 Mine in 1954, in the production of "Dictator" coal.

"consistently better results with AIRDOX"

NON-EXPLOSIVE MINING METHOD

AIRDOX

NON-EXPLOSIVE MINING METHOD

Cuts Costs 5 Ways

- Produces less fines in face preparation
- Rolls coal forward for faster, easier loading
- Easier on "tender" roofs—cuts timbering, bolting
- Lowers cleaning costs by minimizing fines
- Reduces degradation—no shattered coal

DICTATOR

says I. J. RICHARDSON,
President,
Harman Mining Corporation

"Cardox Corporation installed their Airdox System in our No. 3 mine in 1954. We find that we are getting consistently better results with Airdox, inasmuch as the coal produced from this mine contains a larger percentage of coarse coal and the loadability is much better when loaded mechanically. Airdox is economical, too, on a cost-per-ton basis.

"The management of this mine is well pleased with the performance of Airdox and results obtained."

CARDOX CORPORATION • 307 NORTH MICHIGAN AVENUE • CHICAGO 1, ILLINOIS

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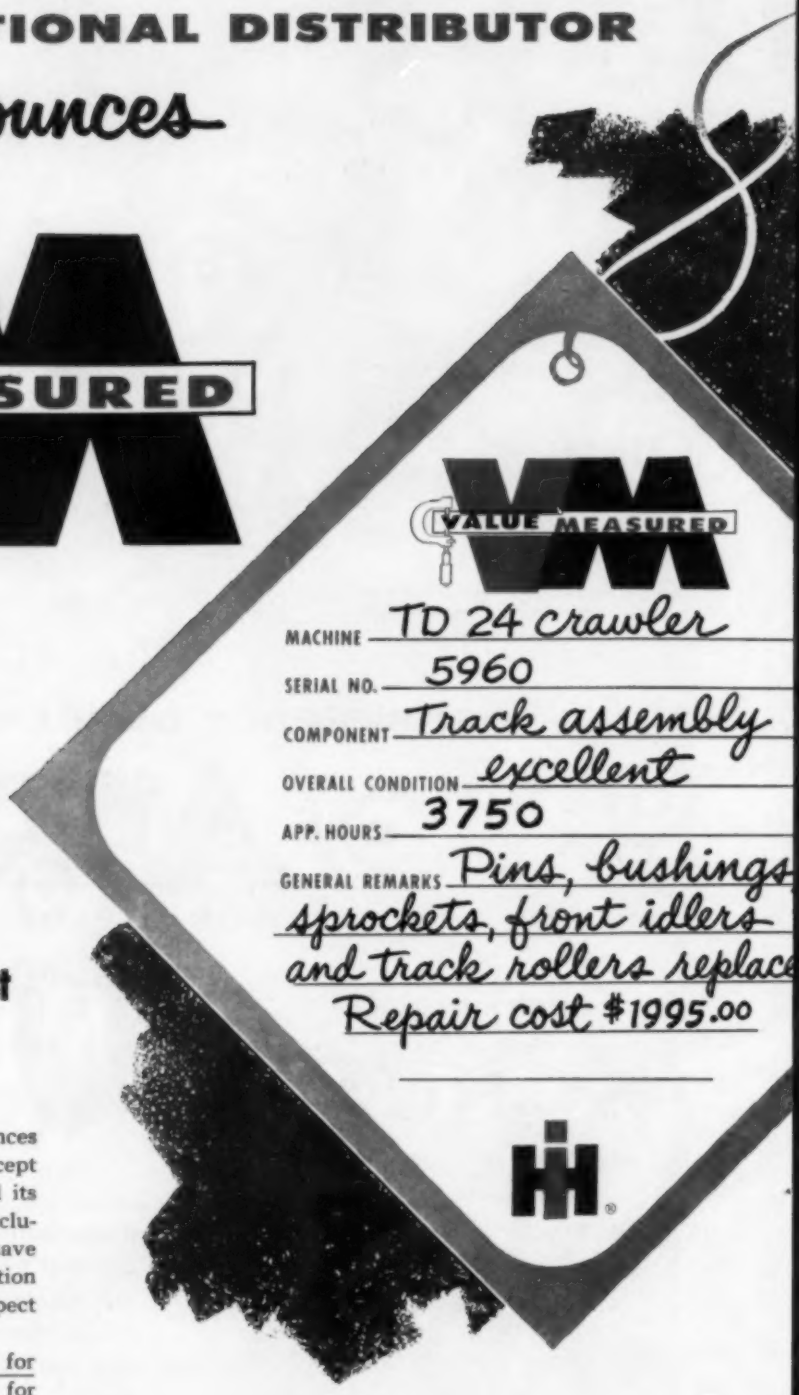
VALUE MEASURED



The exclusive equipment buying plan that Value Measures used machinery and its component parts before you buy!

Your International Distributor proudly announces VM...a revolutionary equipment buying concept that measures the value of used machinery and its components before you buy! Now, under this exclusive International Distributor program, you can have a reasonable answer to your most important question when buying used equipment..."What can I expect of this machine and for how long?"

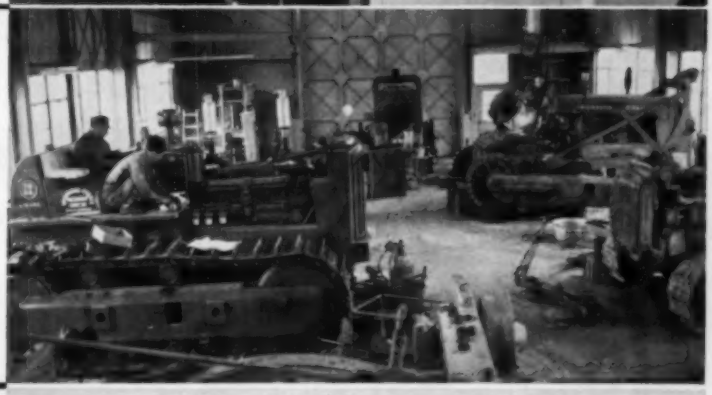
The answer is supplied in two ways, not only for the over-all condition of the machine but also for all the major parts of the machine as well! And the answers are easy to get. They're all tabulated for you on big tags, (see illustration, above), which are attached to the component or near it. Each tag names the component, gives you the over-all condition of it, tells the approximate hours of operation (because parts are changed in units at different times), and shows whether the item has been repaired or replaced with a new part. The tags permit you to examine a piece of used machinery quickly, completely, and with confidence. In fact, VM – the IH Value-Measured Used Equipment Plan–does for you what you yourself would like to do to check used equipment, if you had the time and facilities.

Your International Construction Equipment Distributor has Value-Measured Used Equipment buys on his lot, now. Be sure to see him soon and find out why VM is your best way to buy used construction machinery.

Clean-up! A Value-Measured Used Equipment buy first gets a steam bath before inspection of major parts. Clean machine reveals wear, cracks, other damages which need repair.

Check up! Dynamometer engine testing is typical of thorough inspection and testing before and after worn engine parts are replaced. Testing equipment of this type enables distributor to guarantee performance on VM equipment.

Fix up! After testing, distributor servicemen make necessary repairs and adjustments to equipment. All such repairs and their cost are tabulated on VM tags which you'll find conveniently attached to the components.



Measure up! You'll find the VM buy headquarters sign only at your International Construction Equipment Distributor. Stop here soon if you need used construction equipment...and become acquainted with the industry's newest, safest, and most economical way to buy used machinery...the VM way.

VM Purchase Certificate is your guarantee that every major working area of the used machine has been thoroughly checked and repaired, or replaced, when necessary. It also means your VM used machine is the best buy for the price.

INTERNATIONAL®
CONSTRUCTION EQUIPMENT

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

Rowe Construction Co., Bloomington, Illinois, uses the Model 374 Conveyor, one of many types and sizes of Barber-Greene portables.

The president of Rowe Construction Co. reports

"Our next portable conveyor will be another Barber-Greene"

"We have given our Barber-Greene conveyor four years of hard service and its performance has been tops. We produce sand and gravel for highway departments and for our own use. So we move our plant three and four times a year. Towing our conveyor from job to job presents no problem at all. We just hitch it up to a truck and move out.

"And it was no big job to lengthen our conveyor from 51 to 60 feet. All we did was order a nine-foot intermediate section and bolt it into place. All carriers, returns and decking were already in place and aligned.

"With this kind of reliability and easy flexibility, we feel sure our next portable conveyor will be a Barber-Greene."

Straight-forward reports like D. H. Rowe's provide the proof of the superior performance and widespread acceptance of Barber-Greene conveyors. Handling coal, sand, gravel and other bulk materials, these versatile conveyors operate on a virtually automatic basis . . . cut labor costs substantially.

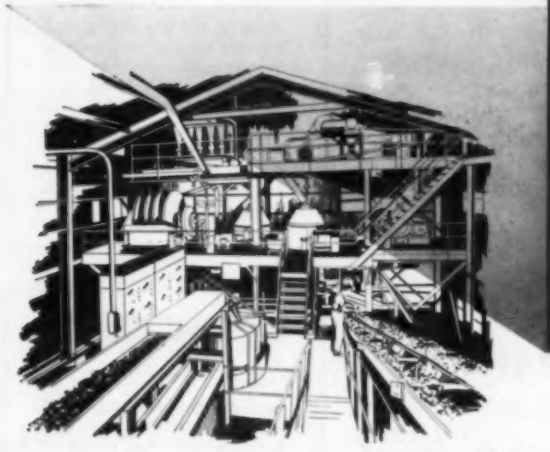
Not just portability, but road-ability is one of the many features that save time and money for the Rowe Construction Co.

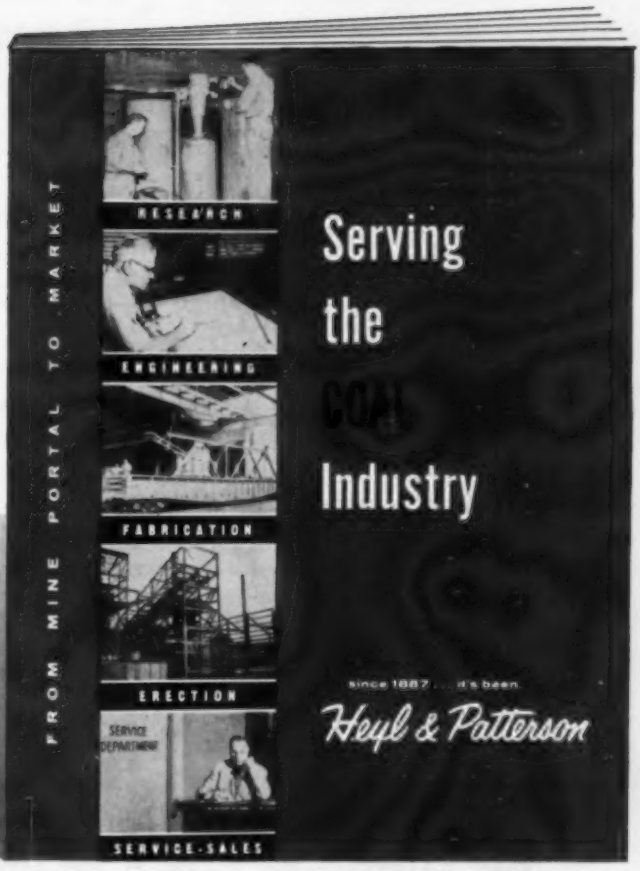
Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

for the file of **COAL PREPARATION MEN...**





YOURS FOR THE ASKING!

THE PURPOSE OF THIS BOOKLET

is to describe some of the more recent facilities built by Heyl & Patterson for the coal mining industry, with emphasis on the H & P Fine Coal Washing and Water Clarification Circuits. Further, there are condensed descriptions of some of the special equipment incorporated in the H & P Circuits.

- COMPLETE COAL PREPARATION PLANTS
- BRADFORD COAL BREAKERS • H & P WET CYCLONES
- REINEVELD FINE COAL DRYERS • THERMAL DRYERS
- COAL & COKE HANDLING EQUIPMENT

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CA

70 YEARS OF SERVICE

Heyl & Patterson INC.

HEYL & PATTERSON, INC., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.
Please send me my copy of your Coal Preparation Brochure.

Name_____ Title_____

Company_____

Address_____

City and State_____

PLAIN PRIMACORD

Textile-covered, flexible and resilient. Suitable for surface trunk lines and shallow holes where tensile strength and resistance to abrasion and cutting are not required. Tensile strength 125 lbs. 1000-ft. spool 17 lbs.

REINFORCED PRIMACORD

Textile reinforced, tough, resilient, flexible. Recommended for surface trunk lines and deep holes where normal strength and resistance to abrasion and cutting are needed. Tensile strength 160 lbs. 1000-ft. spool 18 lbs.

PLASTIC WIRE COUNTERED PRIMACORD

Armored with wire and covered with plastic material. Recommended for use in deep, ragged holes or with metal or fibre explosives containers, where strength and resistance to abrasion and cutting are essential. Tensile strength 300 lbs. 1000-ft. spool 33 lbs.

BLASTERS AGREE that thunderstorms, high tension lines, power cables — even two-way radios — can be sources of stray electrical currents . . . and that they can cause premature shots under certain conditions.

The best safeguard against such hazards is to use a detonating agent which is insensitive to stray electrical currents.

In primary blasting, use Primacord as the detonating agent in each hole and also as the trunk lines to connect all holes so that they will fire in proper rotation. The entire blast can be detonated from one point on the trunk line — with fuse and cap or electric blasting cap. This final hook-up is made only when all is in readiness and when it is *safe* to fire.

In secondary blasting, use Detacord to prime each charge and to connect all charges, detonating it in the same way.

If your holes are primed with fuse and cap, connect the fuses with Quarrycord.

For more information, see your explosives supplier or write to

THE ENSIGN-BICKFORD COMPANY

Simsbury, Connecticut . Since 1836

Primacord and Detacord Detonating Fuse, Ignitacord,® Quarrycord, Safety Fuse, Pyrotechnical Devices and Blasting Accessories

PLASTIC REINFORCED PRIMACORD

Covered with tough plastic material, not affected by high Summer heat or Winter cold. Waterproof—resistant to acids commonly encountered. Use for extremely deep holes, river crossings, field shots that must stand for long periods of time and in other wet conditions. Tensile strength 275 lbs. 1000-ft. spool 22 lbs.

DETACORD

Smaller (and less powerful) than Primacord. Core of PETN is textile-reinforced and wax finished. Identified by light brown surface with cross windings of red yarn forming an "X" pattern. Resilient, flexible. An economical detonating fuse for use in secondary blasting, long hole underground blasting and pipe-line ditching. Not recommended for primary blasting. Tensile strength 100 lbs. 500-ft spool weighs 8 lbs.; 1000-ft spool weighs 16 lbs.

QUARRYCORD

Used to connect and ignite safety fuse in secondary blasting. Burns progressively with an external flame at the zone of burning — about one foot per second. Flexible — not affected by stray currents. 500 ft. spools. Quarrycord Connectors — 100 in a box.

When thunderstorms threaten — or wherever stray electrical currents are suspected

Play it Safe!

USE

PRIMACORD® • DETACORD® • QUARRYCORD®

P-4

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JULY, 1957

IVAN A. GIVEN, EDITOR

Turning Tide?

THE RETAIL COAL TRADE, like coal as a whole, refuses to die off and oblige those who would have interred it long ago. True, it is not what it was. Equally true, it can look forward with some confidence to a turn in the tide and the beginning of a climb that will restore it to affluence at least, if not to its former glory. And if retail prospers the producing fraternity will benefit in turn.

The atmosphere at recent retail conventions in Augusta, Chicago and French Lick is the best evidence that the situation is changing. Some, in fact, go so far as to say that the industry is on the verge of an era of reconversion—and they could be right. The new breed of retailers, ready and willing to go out and sell coal rather than merely take orders, was much in evidence at these meetings, bringing with them success stories not only in moving coal but also the equipment that results in increasing that movement.

The moral for the producing industry is self-evident: Display equal confidence and provide the support that will make it easier for home owners to choose the most-economical and most-satisfactory fuel of all—coal.

Dr. John L.

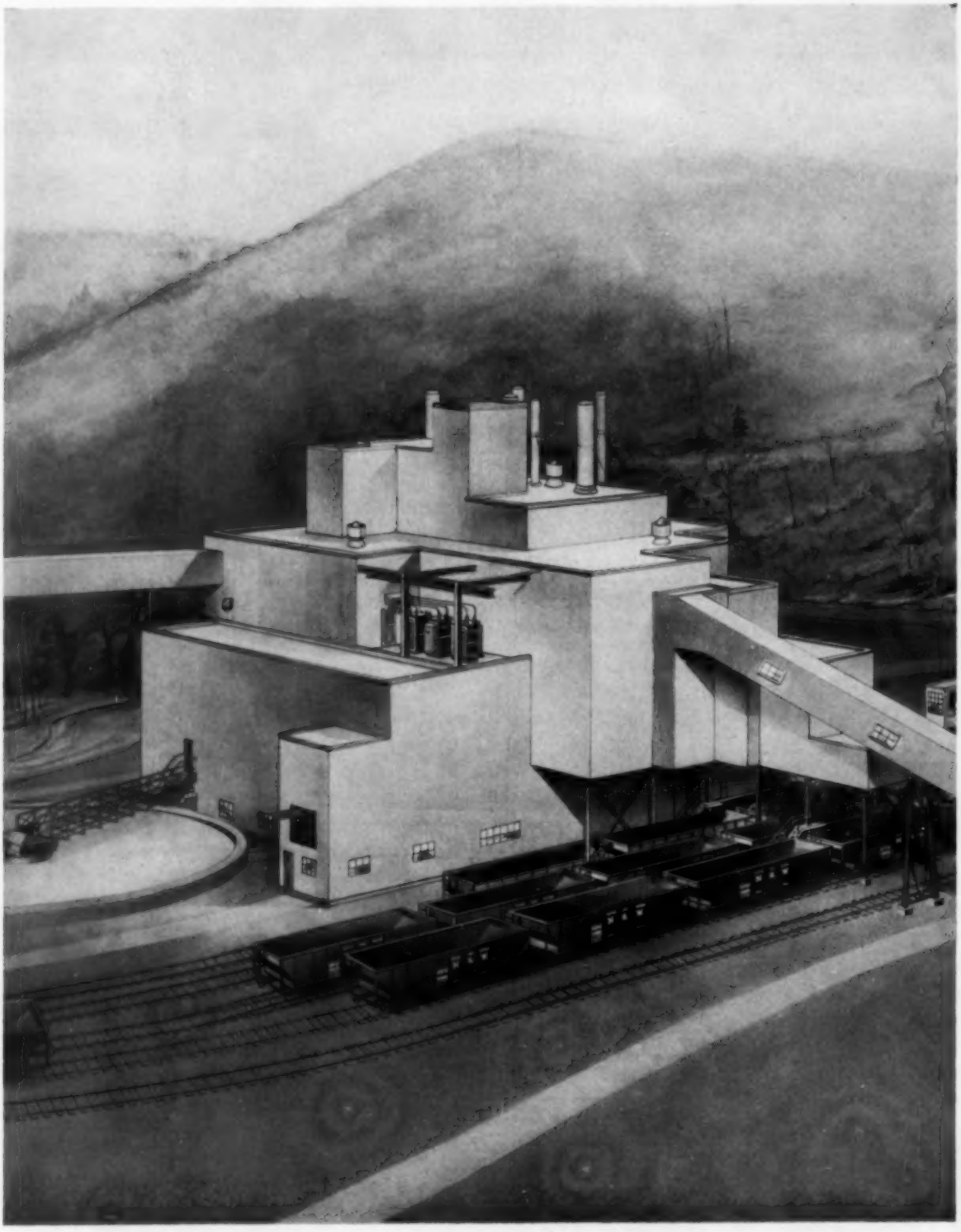
"IN THE CRITICAL VIEW of informed judgment, he is the foremost labor statesman in the world." Thus John L. Lewis was characterized by the president of the board of governors June 3 when he was presented an honorary Doctor of Laws degree by West Virginia University.

The event proved that Mr. Lewis still has the power to precipitate sharp differences of opinion, since the news was greeted with reactions ranging from screams of rage to benign approval—within the coal industry as well as without. It also pointed up once again—and quite visibly—that things have changed. Mr. Lewis is now in partnership with coal in at least one respect—the export trade—and may be in partnership in other respects in the future. The change also is evident in many other facets of his relations with the operating fraternity, with the result that the present situation might be described as close approach to if not real cooperation in the solution of industry problems and advancement of industry interests. This is a relation well worth perpetuating.

Time for Review

BREAKTHROUGHS in technique may appear to be sudden and dramatic—and occasionally are. More frequently, however, they are the result of a long period of research and development, in many instances necessarily preceded by advances in other fields making possible the components that in turn make possible the final product. The AC and torque-converter shuttle cars are cases in point, and open up the opportunities for major savings in equipment and operating costs in coal mining.

The way is not completely cleared yet, however. Until some roadblocks are removed DC must remain a major haulage factor. One big roadblock is the prohibition against internal combustion engines in the code and in certain mine laws—put there at the insistence of the United Mine Workers. The weight of evidence was against this prohibition then and still is. So now that the face problem has been solved there is even more reason for a joint review of the situation and early action for the removal of the ban against the diesel on the main line. Not only would mining cost be cut, safety definitely would be served.



NEW PROPERTIES and programs to improve existing operations to serve old and new users with lower-cost higher-quality fuel bring in the problem of finding money for buying and installing plant and equipment.

Financing Coal's Growth

What the bituminous industry's estimated money needs are. What the advantages of public financing are. What forms of financing are available. How the investment banking industry can help.

By JOHN W. SPURDLE
Partner, Dominick & Dominick, New York

"New opportunities for coal . . . provide a sound basis for investment reappraisal of the industry."

OUR FIRM has had a long relationship with the bituminous coal industry dating back to the 1920's, and encompassing both periods of prosperity and adversity. Early last year, in March, we published a booklet, "The Bituminous Coal Industry," which was probably the first important publication to draw the attention of the investing world to the rebirth of bituminous coal. The booklet opened with these words:

"A major reversal of trend has taken place in the bituminous coal industry. For 25 yr coal has been losing position as a supplier of our national fuel needs, but causes of this decline have lost their force. New opportunities for coal, which appear both strong and enduring now dominate the outlook and provide a sound basis for investment reappraisal of the industry."

In July 1956 we confirmed our faith in this statement as investment bankers by managing the highly successful public offering of the common stock of North American Coal Corp. This was the first public offering of the stock of a coal company in many many years. It also was the first experience of this company and its officers and directors in such things as registration with the Securities & Exchange Commission, preparation of a prospectus, negotiation with an investment syndicate and—introduction to public stockholders.

There are some features of this procedure which corresponds to undressing in public and these are not compatible with the historic practices in the coal industry. On the whole, however, the experience of financing through public offering of securities is a happy one and something which the coal industry should embrace enthusiastically. It is a sound thing to broaden the market for coal securities with a corresponding enlargement of public investment interest, aiding in the proper evaluation of going concerns.

Presented at the 40th Anniversary Convention of the National Coal Association, Washington D. C., June 6.

PUBLIC FINANCING ADVANTAGES

I would like to dwell on this subject for a moment. I will start in the terms of a single company—a good, prosperous, growing company.

It is privately owned with no public ownership or trading in its securities, and wishes to raise money to finance expansion. It probably can do so readily by borrowing from insurance companies, a pension fund and the like. It may not be hurt by lack of public market interest. However, its credit, and the terms on which it may borrow money, should be greatly improved by a wide market in its stock, even more so by listing on the New York Stock Exchange and all of the publicity that attends the affairs of a publicly owned company. Incidentally, these factors do not hurt the business of the company.

If the same company had only a small amount of the stock in the hands of the public, either because it was closely held by family groups or because there were too few shares outstanding, it would be worse off in some respects than if there were no public holdings. Investors generally do not buy stocks which may not have a ready market when they may wish to sell them. This limits the field of interest to investors with special collateral aims and speculators. Such stocks may fluctuate violently on little trading, possibly to the detriment of the company's reputation, but the stocks prevailingly will sell below realistic investment value. This in turn is of no assistance to a company's credit and hardly a satisfaction to its family owners of securities.

THE INDUSTRY PICTURE

It is easy to translate the comments in regard to a single company to apply to the entire industry. At the most less than 30% of the country's 1956 production is in the hands of independent companies, stock of which have a public market and few of these have the desirable features of broad market-ability discussed above. Over the past 2 yr investor interest in the stocks of these companies has risen with the change in industry prospects and stock prices have advanced greatly. Nevertheless, the market evaluation of coal stocks still is generally inadequate, considering their natural resource characteristics, their growth prospects and the underlying soundness of the business.

It is still a characteristic of the industry that the component properties and other assets of a company might be sold piecemeal to other companies with a higher realization than the price which its stock might bring in the market. Moreover, there is no inclination on the part of the public to place any particular value in appraisal of coal-company stocks on coal reserves. Many crude oil production companies are evaluated out of all relationship to their current or early prospective earning power because of public knowledge of their ownership of huge proven reserves of petroleum or natural gas. This is not true in bituminous coal, where the extent and value of reserves

also can be determined. In fact, there is no particular differentiation made in stock evaluation between companies from the point of reserves, as long as they are not inadequate to sustain production for a reasonable period of time.

That this situation exists is a reflection of inadequate or immature investor knowledge of the industry, in part a result of the recency of the change in the economics of the coal industry and in part a lack of satisfactory market representation of coal company securities.

FINANCING CONSIDERATIONS

It may sound a little as though I had wandered from my basic subject, financing the growth of the coal industry, but I think that you can see that a foreward of this nature is useful in tackling the main theme.

The growth prospect in the coal industry is not, in the aggregate, an outstanding thing in comparison to well defined trends in such fields as chemicals, electric power, paper and oil. Moreover, it is responsive growth—not directly generated by the industry itself. Nevertheless, it is real growth, with determinable prospects and it provides opportunities for individual companies to build business in a handsome and even spectacular way if they have the management, reserves and money to capitalize on the industry base.

Within this generalization there are important limitations on the ambitions of many companies to get what they may regard as the key factor in this chance to grow—money.

As you know well, unless mining conditions are ideal, it is difficult to operate a small underground mine profitably. Today's operations require maximum mechanization. The capital investment involved creates a problem, not only in its accumulation or acquisition but also in obtaining a satisfactory return on its use, if the operation is not large enough or generally suspectible to mechanization. Size, both as to the operation and the company, is a limiting factor in financing.

Management is another significant consideration. Over the years, the coal industry probably has attracted less young executive potential than other industries as a field of promise. I believe that the situation is easier now but it probably is still more difficult to build depth and roundness in management in the coal industry than in other fields. Existing managements in many instances have been trained in adversity rather than opportunity. Also, family management has been more prevalent than in most industries.

A company seeking financial assistance will find it difficult to obtain money from either public or private sales of securities if it cannot demonstrate a sound management organization.

Reserves are important, as to amount, economic location and susceptibility to efficient mining. To some extent reserve deficiencies can be cured through financing but there must be a base to assure the investor of continued profitable operation.

Finances, capital structure and financial record must stand scrutiny. A company does not seek new funds unless they are needed, but financing a cash deficiency which has arisen from improvidence, operation of uneconomic properties, overextension of resources and the like is not a proposition which has much appeal to the investment banker. Capital structure can be a problem. A company may have been forced in the past to borrow too heavily or may just have taken the easy way to borrow when it should have sought equity capital. Excessive debt not only affects the value of a company's securities, debt and stock but may limit its ability to interest new investors.

Forward thinking is logically a most important factor in eligibility for financial aid. A phrase has been coined in the field which has real meaning: "Career Companies."

RESULTS FROM MONEY

Unless a company has basic aims to take full advantage of the growth opportunities now existing in bituminous coal, and has well worked out plans to that end, involving the use of the money it seeks, financing is not readily available to it. This applies in any field of endeavor. New money must carry its own load and contribute something extra or it is not being used economically. Whether we are talking in terms of either debt or stock the investor is entitled to know that his money is being used to build a value and that the company, as far as management aims and effort can achieve it, will succeed and progress.

It is easy to see that a large, well financed, profitable bituminous coal producer with good properties and a strong and progressive management team will have little trouble in raising money. This is not as amusing as it may seem. This is the kind of company that can find profitable uses for new money. The obsolescence factor arising from the advancement of methods and equipment, moreover, is pretty hard to keep up with out of self-generated funds in even the most profitable companies.

Financing opportunities are not, of course, limited to companies which already are so well situated. Any company which can pass the tests which I have outlined certainly can explore the possibility of raising new money with every confidence. The most important of all of these factors is management—proven and aggressive management. The next most important consideration is size. This is a real problem for the coal industry. Those companies which have come through the difficult years in the industry successfully and which have moved ahead in the more recent period of opportunity, have done so largely through their ability to reduce operating costs to compensate for rising wage levels and this has been achieved primarily through efficient mechanization of operations.

THE SIZE FACTOR

There are size limitations as well as other factors which govern the extent to which mechanization can be employed. The coal industry is dominated by a few large companies but encompasses between 5,000 and 6,000 individual mines, most of which are separate operations. One spokesman after another in the bituminous coal industry has stated his belief that the future of the industry depends heavily upon the concentration of many of the small units to create more large companies. To be sure, a good number of the bituminous mines are so small that they have no bearing on the question.

There are many hundreds of companies, however, which are businesses in the true sense of the word but which can not afford to utilize fully the progressive methods of the larger companies, nor do they have the operating prospects which would give them a base for raising sufficient money for the purpose. They cannot conduct sales or arrange contracts in the manner of the larger companies.

As a group the smaller, yet possibly worthy, companies have suffered from the progress which has been made by the larger and more efficient organizations in reducing costs and making a good profit at extremely competitive prices. The solution to the problem which has been advanced by industry spokesmen is combining to obtain the substance, management facilities and reserves of a larger enterprise.

There are several difficulties in effecting combinations of smaller units, including the rather characteristically rugged nature of the coal operator, the reluctance of a management or an owner to share responsibilities, authority and ownership, the fact that, initially, combination might

be more a sharing of problems than realizing immediate benefits, and the awkardness of the initial negotiation when the participants may not be well prepared to provide a reasonably complete or accurate account of their own reserves, operations and finances.

All of this work is in the field of activity of investment bankers. There is a close parallel in the work which must be done preparatory to financing and preparatory to a combination negotiation. Moreover, combinations can result in development of a vehicle which can arrange new financing on a basis unavailable to its constituent parts.

The question arises, I am sure, as to the dividing line as to size between companies which can obtain new financing on satisfactory terms and those which cannot. At this moment, there is no useful basis for such definition. No two companies are alike. Different types of mining and different seams vary in their economic possibilities. The industry, outside of the leading independent companies, is privately owned and operating and financial data therefore are scarce. And the investing world's new interest in the industry is not well enough developed to show a real appetite for any but the best coal equities and credits.

For what it is worth, my own idea is that a 2,000,000-ton deep-mine operation is about the smallest for the type of financial assistance investment bankers could handle, and in this size, the company would have to be well equipped.

FORMS OF FINANCING

Basically there are two forms of financing: borrowing and selling stock. There are two markets: public and private.

The natural inclination of a company is to borrow money on long-term arrangements if there is a reasonable prospect that the use of the borrowed funds will take care of interest costs and repayment, with something to spare.

The ownership of the business is undisturbed and the benefits of the expansion are not dispersed. To a degree this philosophy is to be warmly recommended if the position and prospects of the business eliminate any risk that the debt would cause trouble. Borrowing can be overdone, however, without consideration of this risk factor. Financing the growth of a company—a continuous process—should be approached with careful long-term planning. The equity base of a company becomes all-important. Borrowing opportunities for money which can be raised quickly.

The sharing of the ownership of a company may be something that an owner-manager group may face reluctantly. There are advantages, however, which are considerable, especially in a growth industry, where a new dollar can have a real chance to produce earnings. Although the existing owners may not get all of the benefits, earnings applicable to their stock holdings should increase. Equally important is the prospect of a public market for the company's stock. Without repeating the desirable aspects of such a step which were previously outlined, there can be added the prestige value among the industry, equipment suppliers, customers and others; the liquidity afforded family members frozen into investment but not usefully interested in the company; facilitation of evaluation and settlement of estates; the currency value of a marketable stock in acquisition of other companies and properties (including tax advantages in such transactions); the improvement of credit from stock marketability and the enlarged equity base; and the ability to attract young and able executives through stock option plans—which are becoming far more important than salary as inducement.

STOCK V. DEBT

By relying too completely on stock financing in an extended period of expansion, a company loses some of the leverage aspects of use of debt, where temporary use of borrowed money creates an earning asset which can safely make net contribution to the owner's profits.

Relying too heavily on debt, a company can assume unwelcome risk, can use up its borrowing power, which might be a real handicap, and can impair the value of its equity, if it sought to sell additional stock. Any company overburdened with debt may be at a business disadvantage as well.

There are many varieties of securities within the basic framework of debt and stock. A desirable type of issue in some instances, if the company's stock already has a market or one is being created, is convertible debentures. Such debt often can be arranged on better terms than straight debentures and there is the prospect that the debt will be paid off by conversion into stock at prices higher than the stock would bring at the time of issue.

The position of each company considering new financing must be studied with great care, and decision as to the type of securities to be sold should be made to fit its position, plans and prospects, in the light of security market conditions. This is a matter which must be worked out between the company management and the investment banker, each contributing its skill and knowledge to reach the final determination. It is not a matter to be entered into lightly.

You will notice that I have not mentioned bank loans, purchase money mortgages, equipment finance loans and other types of financing which do not fall in the province of the investment banker. These are all good if used the right way. They are all debt, however, in the sense previously discussed.

PLACEMENT CONSIDERATIONS

Private and public placement requires a brief comment. Private placement is ordinarily arranged by an investment banker with an insurance company, a pension fund, a university, a charitable or family fund or the like. Major investment houses are in close relationship with such institutional investors. Instead of registering securities with the SEC and offering them to the public with an underwriting syndicate, negotiations are conducted to sell such securities directly to one or more of these funds.

The advantage of this arrangement is that the company has in effect a single outside investor, who works with it in confidence and may be approached readily if there is any need to revise or expand financing arrangements. A relationship of this sort can be a useful thing. The disadvantage is that such an arrangement also can be confining as such investors usually demand certain veto powers regarding further financing, limiting management flexibility. Also, the benefits of a public market are not obtained.

Whether to use private or public financing also must be determined in each individual case.

The growing need of the bituminous coal industry for additional funds to expand production and improve the efficiency and economy of its operations to reduce costs is all too apparent. Our staff figures that the industry should spend between $1½ and $2 billion dollars over the next 5 yrs for these purposes, and that a great deal of this will represent new, outside money. This gives no consideration to technical developments in usage of coal arising from the industry's enlarging interest in research, which might provide new profitable uses for money.

The industry is in a new phase of growth and forward-thinking companies which seek to take advantage of their opportunities will do well to explore the possibilities of arranging outside financing. Our firm and many others in the investment banking field are highly aware of the useful work which is to be done in bituminous coal and I assure you of a cordial welcome and a sincere effort to be helpful.

SOLID-BOTTOM 15-in chain pans take full capacity of loader. Full length of return chain is always in full view.

Warner Teams Efficient Mining

BRIDGE CONVEYORS and loaders produce up to 912 tons per shift.

Application of industrial engineering principles is key factor in getting high output at Laurel Fork mine where face crews produce up to 76 tons per man in a shift.

COUPLING loader to bridge conveyor is achieved quickly with pin-type connection after place change.

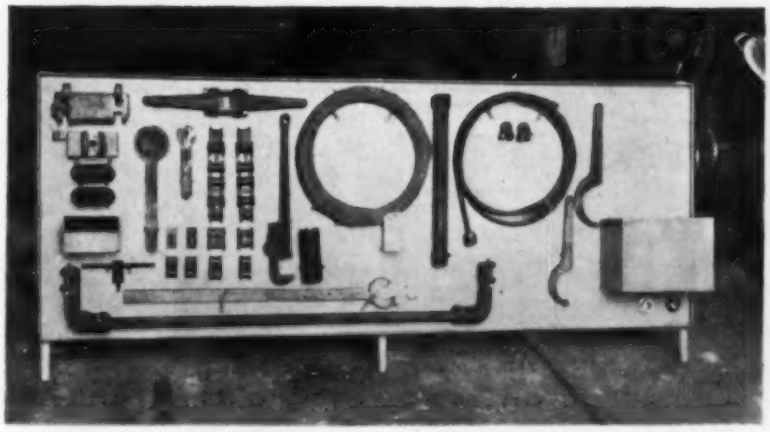
TEAMWORK plays an important role in face cycle. Cutting crew and shotfirer team up to prepare coal.

REGULAR REBUILDING in central shop features special work areas for the various types of underground machines.

With Planned Maintenance

ENGINEERING PRINCIPALS, operating skills and effective maintenance are blended into a smoothly running efficient operation at the Laurel Fork mine of the Warner Collieries Co., Mammoth, W. Va. Effectiveness of the technique is proved by an average output of 45.1 tons of clean coal per face man in headings and 47.6 tons per man in rooms, using bridge conveyor units. Peak production in a double section with 12 men has been 912 tons, or 76 tons per man. Loaders and shuttle cars also perform above average in double sections, producing up to 840 tons with 12 men.

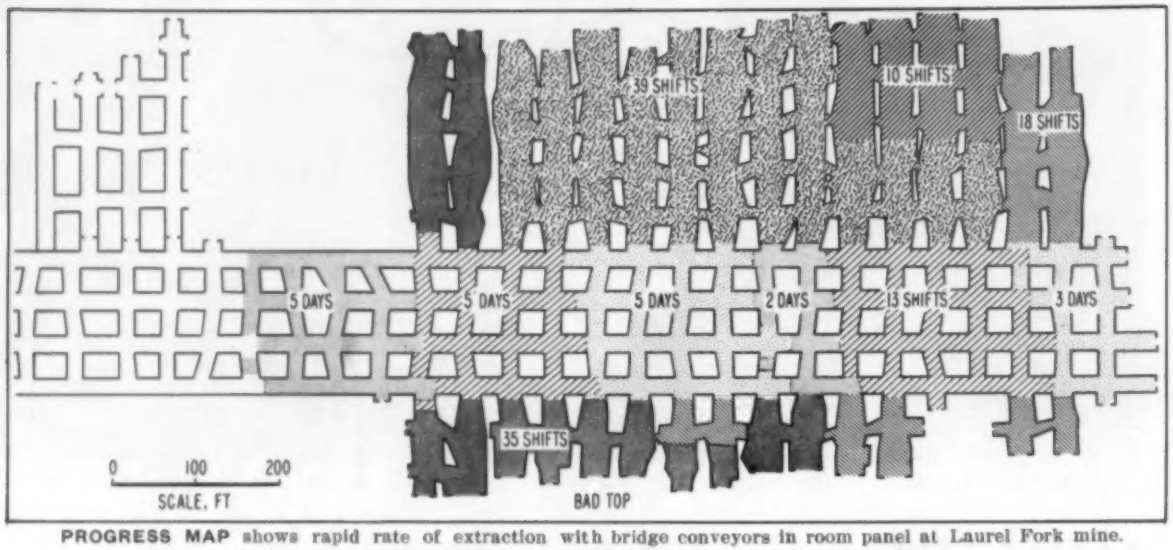
This outstanding performance of production crews did not come about by chance. It is the result of con-



PARTS BOARD for underground section holds items frequently used.

MAINTENANCE REPORT BOARD lists separate work sheets for repair jobs to be done on all three shifts.

PARTS BINS close by repair areas save time in rebuilding machines. Bin index eliminates searching for parts.



PROGRESS MAP shows rapid rate of extraction with bridge conveyors in room panel at Laurel Fork mine.

High Output Marks Bridge Conveyor Mining

Laurel Fork-Production Results

Period	Man Shifts	Clean Tons	Avg. Tons per Man
	ENTRIES		
1/1 thru 1/4	72	3,260	45.3
1/7 thru 1/11	120	6,113	50.9
1/14 thru 1/18	44	2,174	49.4
1/21 thru 1/25	120	5,696	47.5
1/28 thru 1/31	48	2,170	45.2
2/1	23	928	40.3
Total entry	427	20,341	47.6
	ROOMS		
2/4 thru 2/8	166	6,779	40.8
2/11 thru 2/15	179	6,737	37.6
2/18 thru 2/22	168	7,671	45.7
2/25 thru 2/28	90	4,955	55.1
3/1 thru 3/8	132	6,974	52.8
Total Rooms	735	33,116	45.1

On 2/28: 12 men, 825 tons, or 68.8 tpm

REVERSIBLE chain conveyor at end of panel belt permits continuous coal loading as cars are pulled past loading point by double-drum hoist.

tinually applying engineering principals in a program designed to help management do its job more effectively. For several years Warner Collieries has had a separate industrial engineering program in effect for this work.

ENGINEERING STANDARDS

The program was set up by Coal Standards, Inc., coal consultants, and now is being carried out by Warner's own engineering department. It took 100 days of intensive work to set up Warner's industrial engineering department. This included building work standards and training foremen and crews in the application of methods developed and cost control. Headed by a chief industrial engineer, the industrial engineering department gathers and evaluates information on all phases of mining operation. The industrial engineering staff includes a graduate mining engineer and a minimum of two time study observers, who are section foremen undergoing training. All of Warner's production supervisors have been trained in the program.

After Warner opened its Laurel Fork mine the company applied those same principals and standards previously in effect at another mine with similar conditions. Since all of the men were trained in the system, they could apply the previously developed standards to the new mine.

MINING RESULTS

Laurel Fork mine has a total of two producing sections, one equipped with two bridge units and the other with

THE WARNER COLLIERIES COMPANY

DAILY LUBRICATION

MINE:_____ SECTION NO._____ DATE:_____

LOADER SERIAL NO:_____, _____.

Lubrication Points:	Lubricated Yes	Lubricated No	Use Lubricant
1. Frictions RH & LH	☐	☐	Hydl. Oil
2. Gathering Head Gear Case RH & LH	☐	☐	Y
3. Cat Drive Speed Reducer RH & LH	☐	☐	Y
4. Crank Pin Bearing	☐	☐	Z
5. Gear Case Seal	☐	☐	Z
6. Idler Arm	☐	☐	Z
7. Cat Idler RH & LH	☐	☐	Z
8. Conv., Tail Roller	☐	☐	Z
9. Cat Drive Sprocket Bearing RH & LH	☐	☐	Z
10. Conveyor Hinge Pin Upper & Lower	☐	☐	Z
11. Rope Sheaves	☐	☐	Z
12. Conveyor Chain	☐	☐	Hydl. Oil
13. Cat Drive Chain	☐	☐	Hydl. Oil

DUTIES AND RESPONSIBILITIES OF GREASES

1. Properly lubricate all equipment assigned to him.
2. Help float out S/Car crewmen for lunch.
3. Each shift the greaser will clean out the S/Car reel cases and, keep the sheave wheels free of accumulation of obstructive material, also, clean the operators platform and any other accumulation of obstructive material as may be encountered on the wheels and chasis of the shuttle car.
4. Fill to capacity all hydraulic tanks on equipment assigned to him.
5. Grease daily all miscellaneous equipment that may be assigned to his section such as:

   Car Hoist — Conveyors, Head
   Elevators — and tail pieces.
   Piggybacks

6. After performing regular assigned duties, the greaser is at the disposal of the foreman in charge.

PERIODIC MAINTENANCE

	Date: Month	3	3			
	Date: Day	13	13			
Periodic Inspection	Operating Shifts:	1/2	3/4	5/6	7/8	9/10
Motors 20 Shifts	Loaders	6771				
	S/Buggies					
	T/Trucks					
	Machines					
	Piggybacks					
Clutches 40 Shifts	Loaders					6771
Clutches 40 Shifts	S/Buggies					
Cable Reel 40 Shifts	S/Buggies					
	T/Trucks					
Contractors & Switches As Scheduled	Loaders	6771				
	S/Buggies					
	T/Trucks					
	Machines					

Periodic Shuttle Car Lubrication

	Date: Month	3		
	Date: Day	13		
S/Car Serial No.	Operating Shifts:	1/2	3/4	5/6
3220	S/Cars Day			
	S/Cars Nite			
	Symbol			
	Date Greased			
3223	S/Cars Day			
	S/Cars Nite			
	Symbol			
	Date Greased			
	S/Cars Day			
	S/Cars Nite			
	Symbol			

FORMS HELP to simplify record keeping for maintenance men in systematic underground inspection and lubrication.

Planned maintenance keeps equipment in peak operating condition

two conventional units. But only three of the four units work on any one of the three producing shifts. The work plan is set up according to a definite schedule of operation designed to permit the maintenance department to carry out a systematic inspection and preventive maintenance program.

Here is how the schedule operates. On the day shift that two bridge units are operated one loader and shuttle car unit is idle. On the second shift, one bridge unit and the two loader and shuttle car sections are operated. On the third shift, the second bridge unit and the two loader shuttle car units work.

Off-track equipment usually develops all entries. Teamed in a double section, the equipment includes two 14-BU loaders, three 6SC shuttle cars, two Goodman 512 shortwall cutters with bugdusters, 7-ft bars and Carmet or Carboloy bits, two Schroeder hy-

PARTS CATALOGS at central shop are stored in convenient indexed compartments in desk-type file. Top of cabinet provides writing surface.

WARNER OFFICIALS headquartering at Mammoth, W. Va. include John Brooks (left), section foreman; Fred Harris, section foreman; G. M. Conell, mine foreman; and W. E. Smith, superintendent. John Wyatt (left, right photo), purchasing agent and Henry Gorsky, maintenance superindent.

draulic handheld coal drills and a Brown-Fayro double-drum car hoist.

Entries are developed with six headings, each 20 ft wide, on 50 ft centers, with breakthroughs every 60 ft. Equipment is split between the six headings with one loader, cutter, shuttle car and drill being assigned to each side. The third shuttle car alternates between the two sides of the entry.

The double-section crew includes two loader operators, three shuttle-car operators, two cutter operators, two cutter helpers, one shooter, one utility man and one foreman; total, 12. These men prepare and load an average of 24 cuts of coal per shift. In the best single shift, 28 cuts were loaded.

Headings are cut 20 ft wide to a depth of 7 ft after which the cutting crew drills two rows of holes. Each row has four holes and the two inside ones in each row are angled toward each other to form a V or wedge in the center.

Each wedge hole is charged with four 1⅜x6-in sticks of American 3A powder. Rib holes are loaded with five sticks each. The four wedge holes are first detonated together, then the right and left rib holes are detonated separately. The wedge drilling and blasting technique has resulted in a 30% boost in the loadability of the broken coal. As a result, the loading machines are able to clean up a cut of coal in a minimum of time. This improvement in blasting practice came about through the efforts of the industrial engineering department which worked with production men to improve the loading rate.

Shuttle cars carry coal to a car-loading ramp in either No. 3 or No. 4 heading, depending on whether loop-haulage track is installed in Nos. 2 and 4 or in Nos. 3 and 5 headings. Track in the straight headings is laid with 60-lb rail and loops are laid with 30-lb rail. To keep shuttle car hauls as short as possible, loading ramps and loops are moved ahead every 180 ft.

BRIDGE CONVEYORS

Bridge units, usually assigned to room work, sometimes are used to develop room panels. In this work four headings, 20 ft wide, are driven on 50-ft centers with breakthroughs spaced every 50 ft to correspond to room centers. The four headings are advanced by two crews, each one moving back and forth between two headings in a smothly running production cycle.

Equipment includes Long 400R and 400 DBH 15-in chain conveyors with solid bottoms and PT15A or PT15B bridge conveyors in each heading; two Joy 14-BU loaders, two Goodman 512 cutters with bugdusters on Joy T-2 trucks; two Schroeder hydraulic handheld drills equipped with Kennemetal augers and Carmet bits; and two Long gathering chain conveyors carrying coal to a Goodman 97HC 30-in panel belt set up in either of the two inside headings.

Headings are advanced 250 or 300 ft from each setup, depending on when it is most convenient to move up. The belt conveyor is extended at the same time the face equipment is moved up. New sections of Goodyear belt are joined with Hayden or Minet splices.

BRIDGE-UNIT CREWS

Each crew on a bridge unit includes a loader operator; loader helper, who cleans up along the panline, sets safety timbers and shovels loose coal from the rib; two cutter operators, who also help drill, one shooter; and one utility man, who brings pans or supplies to the face and extends the panline. One foreman supervises the two crews.

Rooms on 50-ft centers are driven four at a time with two bridge units. Breakthroughs also are cut on 50-ft centers. Opened 20 ft wide, the rooms are gradually widened to 40 ft in 25 ft of advance and driven to a depth of 250 ft.

The face cycle at Laurel Fork mine was set up by Warner's industrial engineering department. Each man in the crew goes about his work in a systematic manner and knows exactly what he is to do and when to do it. The company reports that the net result is a smoothly running crew that gets more productive work done with less effort.

In brief, here is how the face crew functions in a pair of rooms. The loader operator always starts loading a fresh cut at the right side of the room. While he is doing this, the loader helper cleans up loose coal along the panline. As soon as coal in the right corner is loaded the helper sets safety timbers in that area and then shovels any remaining loose coal along the right rib, getting it ready for the cutting crew.

The first job for the cutting crew on arriving at the face is to drill four holes in the right side of the coal face. Then they sump the cutterbar and start cutting across the face. While the operator cuts across the face, the cutter helper and shotfirer finish drilling. After they finish drilling, the shotfirer shovels bugdust and the cutter helper sets timbers at the left side. While cutting, drilling and timbering

are in process, the utility man extends the conveyor line.

It takes 10 shifts to drive a pair of 40-ft rooms to their projected depth of 250 ft. Equipment is transferred to new room sites on an idle shift and can be moved and reset ready for production in one shift.

Room conveyors dump directly onto a Goodman 97 HC 30-in belt conveyor which carries coal to the mouth of the room panel. There it drops into a Goodman Yo-Yo that permits uninterrupted loading of 3½-ton drop bottom mine cars. Cars are assembled in 16-car trips and hauled to an outside storage bin by Goodman and Jeffrey 10-ton locomotives.

Bridge sections (two bridges, 4 places) are now averaging 15 cuts of coal in rooms per shift, or 675 to 700 tons, depending on coal thickness.

SCHEDULED MAINTENANCE BOOSTS EFFICIENCY

The company relies heavily on an organized maintenance program to keep equipment in peak condition for production crews. Warner's system of scheduling work shifts for production equipment was set, up to permit an inspection and preventive maintenance program to be carried out. Developed as part of the industrial engineering program set up with the aid of Coal Standards, Inc., the system works like this. On each of the shifts two mechanics and a greaser go to the idle, or non-producing unit, and perform scheduled maintenance work as well as make systematic inspections. The company recognizes that a systematic maintenance program requires paper work. But this is kept to a minimum and simplified by using standard forms which are easily filled out. Forms are attached to an aluminum clipboard which is carried into the mine.

To simplify daily inspections and at the same time standardize the procedure, the company compiled a set of inspection rules that tell mechanics not only what to check but also how to do it. This inspection routine is followed each day on all shifts of the mine.

If trouble or a weak part is observed while making the inspection, it is recorded on a special form called a confirming work sheet. This sheet is used as a follow through, or work sheet, from the time the trouble is detected to the time it is repaired to standard.

This sheet has space at the top to describe the trouble and room at the bottom to list the materials needed to correct the trouble. The materials needed are listed on the work sheet as the inspection is made. When the maintenance men return to the surface at the end of the shift, they go to the mine office where parts catalogs are available and fill out a supply order in duplicate for every job that needs to be done. Each mechanic has a clip board to which the confirming work orders are attached until the job is completel. Orders for parts are clipped to a separate board.

Both copies of the supply order are sent to the purchasing agent whose office is located at the company's central shop. When the material for a job is sent to the mine, the duplicate supply order is attached to it. Incoming parts are placed in separate spaces on shelves in the mine office where a mechanic can pick them up on his way to the mine.

After mechanics complete the daily inspections, they start work on a job which previously had been listed on a confirming work order. Jobs are completed in the shift so that equipment is ready for work the following shift. Job assignments and the flow of parts listed on confirming work orders to the mine are under the supervision of the company's superintendent of maintenance.

When the job is completed, the duplicate is stapled to the confirming work sheet and sent to the maintenance superintendent's office. This particular job then is removed from the work list.

In addition to daily inspections, the company has set up a periodic inspection schedule for items not needing daily attention. Included in the list are contactors, switches, motors, clutches and cable reels. These items are listed on a special periodic maintenance sheet which is set up for 40 shifts, the maximum period set for any of the inspections. These inspections are spread out or staggered in time so that they do not interfere with the daily work. Experience has determined the frequency with which these periodic inspections should be made. For example, cable reels are checked every 40 shifts and electric motors every 20 shifts.

Two lubrication schedules are provided for each greaser. One of these is a daily lubrication schedule that lists the lubrication points and the type of lubricant to be used in each. The second chart is a master schedule for those places not requiring daily attention and tells when and where to put the grease.

Backing up the scheduled underground maintenance work is a program of rebuilding carried out at Warner's central shop in Mammoth. Shop work is divided into complete rebuilding of machines or repairing unit assemblies for rapid changeout underground.

SPECIAL WORK AREA

A feature of the shop layout is special areas set aside for specific rebuild work. For example, panelboards are always rebuilt in one corner where all the component parts are stacked in bins within easy reach of the electrician. To permit a repairman to work more easily, a swinging rack is mounted on the work bench so that the worker can have both hands free to work on the panelboard.

Unit assemblies, such as, speed reducers, clutches, transmissions, gathering head gear cases, takeup idlers and hydraulic jacks are rebuilt in another area at a special unit assembly bench. Component parts for these are stored close at hand in marked bins.

Loading machines also are torn down and rebuilt in a special area. Three aisles of parts bins stand along the wall in this area. A key listing with bin numbers and the part each contains is painted on one bin panel. A mechanic can tell at a glance exactly where to find a part for a rebuild job. He also takes only a few steps to get the part and return to the job. Four men hande all of the rebuilding work under the direction of the superintendent of maintenance. The cost of each rebuild is charged to the section from which it came.

Separate costs and performance records for each piece of equipment are kept in a file in the office of the superintendent of maintenance. A separate daily record of materials is made for each machine. These are added at the end of the month and recorded. Items listed on the records also include hours delay per month and to date; tons mined per month and to date; and maintenance in dollars per month and to date. This information is used to schedule equipment rebuilds. Rebuilding costs, divided into material and labor expenses, are kept separately.

Warner Management

K. M. Marquis, chairman of the board
Whitney Warner Jr., president
Myron Kok, vice president and general manager
Carl Marshall, vice president and sales manager
W. E. Smith, superintendent
Charles Sanford, industrial engineer and assistant superintendent
Henry Gorsky, maintenance superintendent
G. M. Connell, mine foreman

DRAGLINE removes cover in 14-cu yd bites while working around the clock. Pit width averages 90 ft.

Stripping and Augering Yields

Efficient drilling, low-cost blasting mark operations at Ohio River mine.

A THREE-PRONGED ATTACK with shovel, dragline and highwall auger nets 40,000 tons of coal each month at the Cheshire (Ohio) mine of the Ohio River Collieries. All three units work around the clock to provide coal for the hungry furnaces of a nearby power plant on the Ohio River. Efficient overburden drilling coupled with low-cost blasting, are key factors in the successful recovery of an irregular seam of coal covered by abrasive sandstone throughout the property.

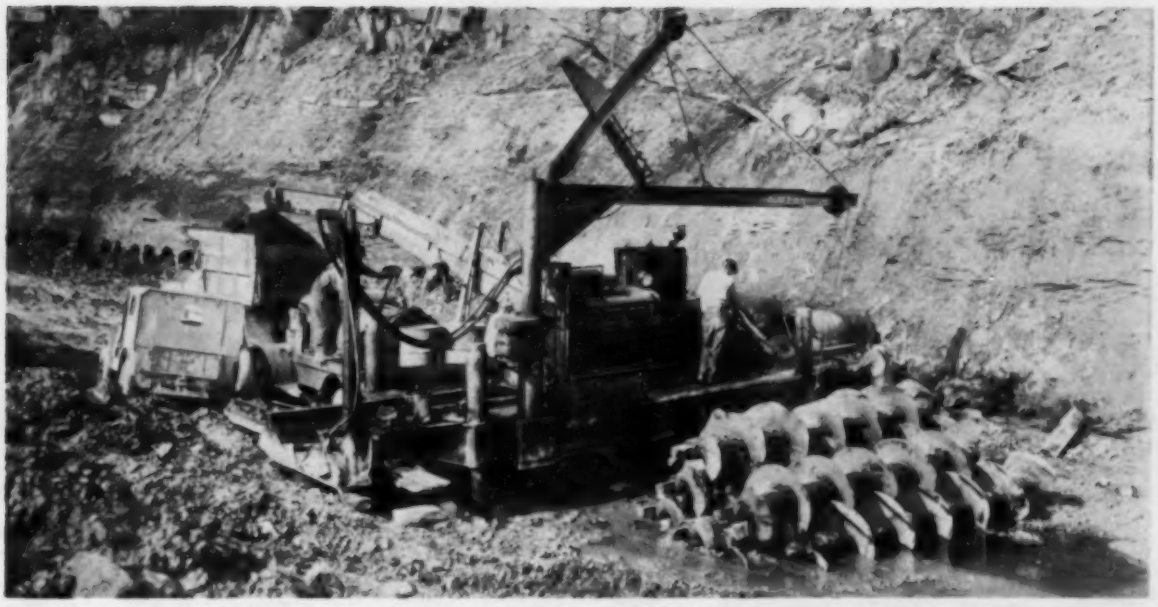
DIESEL SHOVEL with 3½-cu yd dipper also works three shifts while uncovering coal where cover is thin. Unit uncovers 10,500 tons per month.

The biggest share of the 40,000-ton output comes from the dragline pit where a 14-yd unit uncovers 20,800 tons. In the second pit, a 3½-yd shovel strips 10,500 tons and a 30-in auger recovers 10,000 tons.

The scene of operations at Ohio River's mine is less than 10 mi from the Ohio River. In January of this year the average haul to barge-loading facilities at the river was only 7.4 mi. Mining is in the Pomeroy 8A seams which is minable only in the vicinity of Cheshire. The seam ranges from 2½ to 4 ft in thickness and frequently dips and rolls.

Sandstone of varying thickness covers the coal throughout the property. It becomes softer at the north and northwest portions of the property but in other sections of the property drilling is made difficult by the presence of hard inclusions. In other places there sometimes is a very hard 6- to 8-ft layer near the top of the sandstone formation. This tough layer is found in lens-shaped deposits. Because of the irregular characteristics of the sandstone close attention is given to blasting practices.

Aside from having irregular structure and hardness, the sandstone is very abrasive. As a result the company must keep a close check on



HIGHWALL AUGER adds 10,000 tons of coal per month to output. Self-moving auger is operated by three men.

40,000 Tons per Month

buckets and dippers to prevent excess wear. Teeth wear so rapidly that they must be rebuilt on an average of every two days. Esco caps are used for this job.

DRILLING AND BLASTING

Ohio River Collieries relies on two truck-mounted Salem-McCarthy auger-type drills to sink 8⅝- and 9-in blastholes. Each of the machines is operated by two men who spot holes 35 ft apart in rows on 30-ft centers. These two drills are able to put down enough holes in one shift to permit a Marion 7400 dragline with a 14-yd bucket and a Marion 111M shovel with a 3½-yd dipper to work around the clock seven days a week.

Each crew sinks an average of 600 ft of hole in a shift. Blastholes are drilled up to 80 ft deep in the thicker overburden where the dragline works and are correspondingly shallower in the shovel pit. Holes are logged to provide a guide for the blasting crew in charging.

The Ohio River Collieries Co. makes its own blasting agent in a special split-level building designed for efficient handling of the ingredients and the mixed product. Raw materials, Spencer prilled ammonium nitrate and No. 2 fuel oil, are delivered by truck to the top level of the building. Oil is stored outside in a tank and piped to the mixing hopper and 100-lb bags of ammonium nitrate are stored inside on ton pallets.

Two men handle the job of mixing the blasting agent, transporting it to the pit and charging holes. They mix only enough at a time to meet the daily needs. One man works at the top level of the mixing plant where he feeds ammonium nitrate and fuel oil in the proper proportion to a mixing bin. Fuel oil is fed to the ammonium nitrate at the rate of 3 qt per 100 lb. A screw in the bottom of the bin mixes and conveys the two ingredients to a chute where it drops to a lower level. There the second man fills water-repellent Bemis bags with 40 lb of the mixture. These are

Summary, Stripping Performance

	Stripping Unit			All Units
	7400	111M	80D	
Per cent op. time, Jan., 1957	73.00	75.46		
Per cent op. time, yr to date	73.00	75.46		
Per cent op. time, beg. to date	83.92	79.94		
Cu yd, Jan., 1957	213,914	134,615		348,529
Cu yd, yr to date	213,914	134,615		348,529
Cu yd, beg. to date	18,717,352	6,476,886	2,512,931	27,707,169
Cu yd, yr to date, mo. avg	213,914	134,615		
Cu yd, beg. to date, mo. avg	306,842	106,178		
Cu yd per op. hr, Jan., 1957	420	256		
Cu yd per op. hr, yr to date	420	256		
Cu yd per op. hr, beg. to date	534	194		
Clean coal uncovered, Jan., 1957	8,834	8,876		17,710
Clean coal, uncovered, yr to date	8,834	8,876		17,710
Clean coal uncovered, beg. to date	1,259,423	637,574	297,416	2,194,413
Clean coal uncovered, mo. avg to date	20,646	10,452		
Ratio, Jan., 1957	24.21	15.17		19.68
Ratio, yr to date	24.21	15.17		19.88
Ratio, beg. to date	14.86	10.16	8.45	12.63
Avg. height, Jan., 1957	77.12	14.42		

TRUCK-MOUNTED AUGER drills blastholes at the corners of 30x35-ft rectangles. Two men sink 600 ft per shift.

SPLIT LEVEL plant permits easy mixing of explosive. Raw nitrate and bagged product are stored on pallets.

MAKE-YOUR-OWN blasting agent cut blasting cost and improved fragmentation of rock. Two men mix and package product in addition to charging holes.

stacked on pallets and wheeled into an adjoining room. When a day's supply is prepared, the men wheel the pallets onto their Dodge Power Wagon field truck and head to the pit.

Holes are charged at an average ratio of 1 lb of blasting agent to 6 cu yd of overburden. But this ratio varies somewhat with the hardness of the overburden. The company's rule is to use the blasting agent in the same ratio, pound for pound, as commercial explosives.

To maintain the proper powder ratio, deck loading frequently is used. If overburden is 40 ft or less, full column loading is done; if 40 to 60 ft, two decks are used; and if 60 to 80 ft three decks are loaded. When deck loading is practiced, no more than 20 ft of stemming is placed between charges. Each deck is primed with 10% by weight of Austin AL 4 60% dynamite. Holes are laced with Austin detonating fuse and detonated with instantaneous blasting caps.

Aside from cutting the cost of breaking rock very significantly, the company reports other benefits. For example, there is better fragmentation and digging is easier because the rock is broken into a loose pile. As a result there is less wear and tear on stripping units, and they can move more material per hour.

UNCOVERING THE COAL

The Marion 111M diesel shovel works in areas with thinner cover and removes up to 40 ft of material. Usually it is not necessary to blast the overburden for first-cut stripping. But the thin-cover stripping has its drawbacks too. Sometimes the coal is weathered when under as much as 20 to 30 ft of cover and must be discarded.

Swinging its 14-cu yd bucket from a 165-ft boom, the Marion 400 diesel-powered dragline moves 460,000 cu yd of material per month under ideal conditions. For the entire year of 1954, the unit handled an average of 377,000 cu yd per month.

Pit width averages 90 ft, but the dragline can take a 120-ft swath as it moves along the shot bank. Up to the present time the dragline has handled an average of 42.4 ft of cover. In January of this year the unit stripped an average of 77 ft.

An International TD 24 bulldozer works with the dragline to prepare a bench and perform miscellaneous other chores. A Caterpillar motor grader and second TD 24 work in the shovel pit to remove any soft or weathered coal in first-cut stripping.

LOADING AND HAULING

Coal is loaded only on the day shift. A Marion 93M diesel shovel with a 3½-yd dipper loads in the dragline pit and a Bucyrus-Erie 37B shovel with a 3-yd dipper loads in the shovel pit.

Coal is hauled to the barge-loading site on the Ohio River in two stages. For the first 6-mi leg of the haul the company uses 12 end-dump trucks made up of Mack and Autocar 15-ton units. Three additional trucks are maintained as spares. These units can

RIVER TERMINAL receives coal from 27-ton trucks that travel 1.4 mi between river and bin at foot of hill.

BARGE is loaded at the rate of 450 tph by 30-in belt conveyor. A 920-ton barge is loaded in 2 hr and 10 min.

dump directly into either of two bins located on the outcrop or deliver coal to a nearby stockpile. They usually unload into a 100-ton bin feeding a picking screen and crusher. When this bin is filled, they dump into a 400-ton bin which is linked to the first bin by a belt conveyor. If these two bins become filled, coal is stockpiled on the ground.

A pair of 36-in reciprocating feeders under the 100-ton bin deliver coal to a 4x16-ft vibrating screen which makes a separation at 1½ in. The plus 1½-in product is hand-picked and then flows to a single-roll Jeffrey crusher where it is broken to 8 in top size. This product is further reduced to 1½x0 by a Gruendler ring hammer mill.

The 1½x0 drops onto a 36-in belt which carries it 400 ft downhill to a 200-ton steel storage bin. Hand-picked refuse is carried away by another belt and discharged along the hillside. A bulldozer levels the refuse as needed.

Two 27-ton semitrailer units, made up of Mack tractors and Truck Engineering trailers, shuttle back and forth between the bin at the foot of the hill and a bin at the river. A third unit is maintained as a spare.

Drivers load their own trucks without leaving their cabs. This is made possible with the aid of mirrors that permit the driver to observe his trailer being loaded, plus pushbutton control of electrically operated gates under the bin. The pushbutton is suspended from an arm that permits it to move ahead with the truck as the trailer is filled.

The semitrailers carry the coal 1.4 mi to a 100-ton bin at the loading facility on the Ohio River. A 36-in belt transfers the coal to the waiting barge at the rate of 450 tph. It takes 2 hr and 10 min to load a barge.

COAL LOADING is carried out in two pits with diesel shovels. A fleet of 15-ton end-dump trucks carries coal 6 mi to storage center.

AUGERING

Ohio River Collieries adds 10,000 tons of coal per month to its output with a Salem-McCarthy self-moving 30-in auger. Working three shifts per day, the unit produces 400 to 500 tons. The highest output in any one shift was 275 tons and over 200 tons has been produced frequently in average conditions.

The auger works in areas that were previously deep mined. Sometimes holes have been drilled to a depth of 192 ft, but other times only 50 ft or less. Three men perform all of the augering duties. One man operates the diesel-powered auger, another adds or removes auger sections with the aid of a crane, and the third man operates a Barber-Greene elevator that carries coal from the auger to waiting trucks.

F. A. Howe, superintendent, is in direct charge of operations at the Cheshire mine. Assisting him in carrying out his duties are David Rohe, chief engineer; W. W. Webb, master mechanic; and S. R. Fleming, purchasing agent and chief clerk. Other supervisors include Edward Freeman, pit foreman; F. D. Jennings, land agent; John Hornsby, shop foreman; and W. C. Little, preparation foreman.

TEST, TAKE DOWN AND TIMBER—the three T's—will lead to better and better roof safety records if they are observed with diligence every hour of every working day. Supervisors and workmen are responsible for safety.

Wanted: A 50% Cut in

Industry-wide campaign is now underway with the aim of reducing the toll taken by roof falls in coal mines. Intensive drive to prevent such accidents ends June 30, 1958. Individuals and mines achieving safety goals will receive awards.

PLANS for a year-long campaign aimed at slashing the death and injury toll from roof falls in coal mines—the No. 1 death-dealer to coal miners—is announced by a campaign steering committee representing all segments of the industry.

Goal of the international campaign, which begins July 1 and continues until June 30, 1958, is a 50% reduction in roof-fall injuries and fatalities.

The campaign is sponsored jointly by the American Mining Congress, Bituminous Coal Operators Association, the Coal Mining Section of the National Safety Council, the Mine Inspector's Institute of America, National Coal Association, Southern Coal Producers Association, United Mine Workers of America, U. S. Bureau of Mines, state and provincial mining departments and coal mining publications.

The sponsoring organizations want no repetition of the 244 deaths and about 5,000 disabling injuries from roof falls that occurred in U. S. coal mines last year—worst mark in recent years and, of course, entirely too high.

They fear that this large toll of injured and killed will continue unless more aggressive measures are taken to prevent such accidents.

Any underground coal mine in the United States, Canada or elsewhere is eligible for the campaign. Companies operating two or more mines will enroll each separately.

Entrants will provide a simple report of injuries resulting from falls of roof, rib and face for one, two or three years previous to July 1, 1957, depending on the period for which records are available. Participants will provide a report at the end of the first 6 mo of the campaign and a similar report covering the campaign's final half.

To help participants carry on a continuous and effective campaign during the year, the National Safety Council will make available various materials, including promotional aids, as follows:

SPONSORS OF THE CAMPAIGN provide promotional literature for distribution at mines participating in the safety-improvement drive. Awards will be presented to individuals and mines achieving their safety goals.

Roof-Fall Accidents

Two-color announcement posters for informing employees of the campaign.

Two-color special posters (a series of 12, one for each month of the campaign) emphasizing ways to avoid injury from roof falls.

Scoreboard posters showing a monthly comparison of injuries from roof falls for the campaign year with the corresponding month of the previous year.

Twelve information sheets covering such subjects as how to detect loose roof, the importance of observing standard roof bolting or timbering plans, facts about falls of roof, etc.

Illustrated booklets (a series of four) emphasizing safe practices pertaining to the prevention of falls of roof.

Suggestions on concluding an effective campaign will be provided participants upon enrollment together with sample posters and other materials.

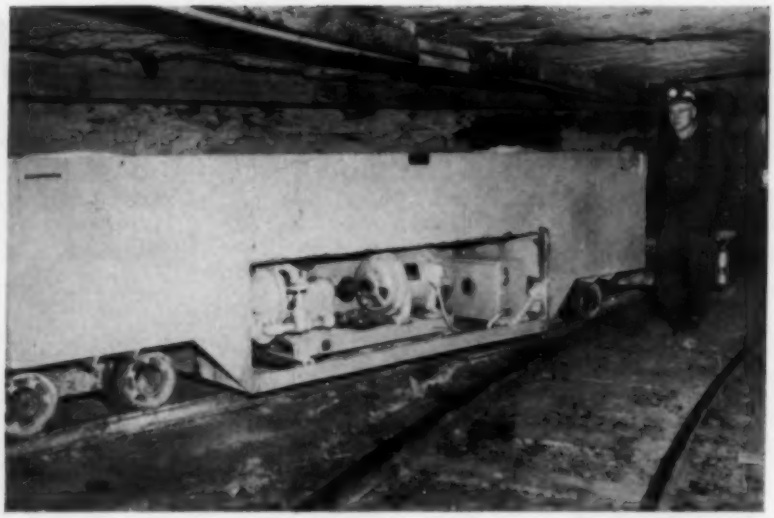
The National Safety Council will award the following certificates to mines, supervisors and union locals that meet the campaign goal and other requirements:

1. Certificate of Achievement. To win this a mine must have conducted during the campaign year a minimum of six safety activities aimed at the prevention of roof falls. And it must have achieved either (1) a 50% reduction in the frequency of injuries from a fall of roof, rib or face by comparison with the average frequency for the previous one, two or three fiscal years, or (2) a perfect record of no chargable injuries from such falls.

2. Certificate of Commendation. This may be won by a supervisor of production workers if during the campaign year he has had no chargeable injuries from falls of roof, rib or face on his record, and if at least once a month during the campaign he contacts each man under his immediate direction regarding roof fall accidents.

3. Certificate of Meritorious Service. This will be awarded any union local whose members are employed in a mine or mines that meet the campaign goal as specified for the Certificate of Achievement, and whose safety committee carries on the required minimum activities directed at the prevention of roof falls. Such activities include calling attention to safe work practices for preventing roof falls, informing union members of the campaign and its progress, and otherwise cooperating in the campaign.

A Certificate of Commendation will be given safety committeemen whose union local wins a Meritorious Award.



WATER Plentiful supply of water and modern means for getting it to the point of need, using the fire car at right, for example, are mainstays in Pittsburgh Coal's fire-control procedures.

Fire Control for Today's Mining

Effective fire control requires proper equipment, trained men and good organization. Here is a description of how Pittsburgh Coal Co. plans ahead for emergencies that might arise.

CHEMICALS 20-lb and 150-lb dry-chemical fire extinguishers provide on-the-spot agents.

ROCK DUST Caches along haulage ways and in sections are added protection.

SUPPLIES Materials for erecting seals or ventilation auxiliaries are stored in fireproof rooms 2 mi apart along main haulage road. Safety inspectors make sure the specified supplies are available in storage.

ESTABLISHING up-to-date fire-prevention and fire-fighting procedures in keeping with the demands of modern mechanized coal mining has been for some time a major project for study and action at properties of the Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., and affiliated companies, Library, Pa. Results of Pittsburgh Coal's efforts include the installation of fire-prevention equipment, the establishment of definite fire-fighting procedures and the continuous training of men and officials in the steps to be taken in the event an emergency occurs.

This overall approach is based on the knowledge that the best installation of fire-fighting equipment may be worse than useless if nobody knows how to use it, because it only provides a false sense of security. On the other hand, highly trained men would be frustrated and ineffective in an emergency if adequate supplies and equipment were not available. Equipment and training are vital, but one more ingredient is necessary to round out a full program for fire prevention and control. That is effective organization.

Frequent, thorough inspections of the company's mines by Federal, State and company inspectors are effective in detecting the presence of conditions which might conceivably lead to ignitions. The object of the company's inspection program is to neutralize unsafe conditions as soon as they are discovered. The Pittsburgh Coal fire-control program provides for handling unforeseen developments that may not have been evident at the time of the inspection. Following is an account of what the program includes and what it is designed to do for protection of life and property.

PROVIDING UP-TO-DATE FIRE-CONTROL EQUIPMENT

Water lines to all working sections, fire trucks stationed at strategic points, wheeled-portable and hand-type fire extinguishers in quantity, caches of Self-Rescuers and storerooms containing emergency supplies for fighting fires are all included in the master plan.

Following is a description of the fire-control layout at the large, new Mathies mine of the Mathies Coal Co. for which the Pittsburgh Coal Co. is responsible.

The tipple is located on the Monongahela River and the farthest working section is approximately 9 mi away. Openings are a drift and four shafts, two of which are 55 ft deep, one is 90 ft deep and the fourth is 320 ft deep. Average daily employment is 980 men, 870 of whom work underground in the Pittsburgh seam. Daily production from 18 mining units working three shifts is 13,600 tons. The Pennsylvania Dept. of Mines and Mineral Industries classifies the mine as gassy.

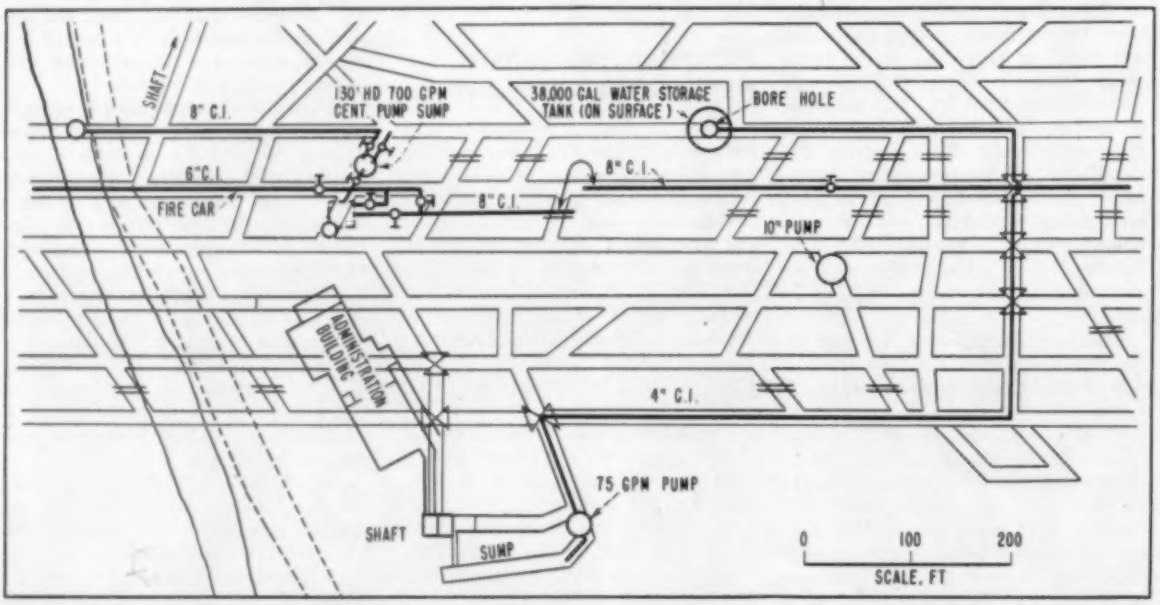
First consideration was given to providing an adequate water supply throughout the mine and right up into the working sections. In most instances this line into the working section is used as a spray-water line, but to serve its fire-control function the line must be so designed that flow pressure at the inby end will be adequate for fire fighting. One solution, adopted by Mathies is to install pipelines of such diameter that line losses will not excessively reduce the volume of discharge at the most distant outlet. The piping layout is as follows:

A number of sumps have been built along the main haulage road to collect mine water, and at each sump a pump is installed to discharge into an 8-in line which discharges into a main sump near the foot of the first manshaft. A 700-gpm pump discharges water from the main sump to the surface through a borehole. However, a series of valves have been provided at the pump to permit this water to be pumped into the mine rather than to the surface in the event of an emergency. This arrangement is shown in an accompanying diagram on the next page.

In addition, a 50,000-gal tank has been erected on the surface at the second manshaft. Water may be discharged into this tank from a deep-well pump and introduced into the mine through an 8-in line. In the mine the 8-in line is reduced to 6 in to provide a water supply along the main haulage road in this portion of the mine. A 38,000-gal tank is installed on the surface at the first manshaft. Section lines of 2-in pipe are tapped from these haulageway lines at the entries leading into producing areas. The standard is to insure a pressure of 50 psi at farthest inby points. Fire hydrants are provided at 500-ft intervals along the main lines, and in the producing panels a plug is inserted at each of the previous loading points, which are 250 ft apart.

PAIRS OF INDIVIDUAL MASKS are installed at 2,000-ft intervals on main road and boxes of 15 units are kept in producing sections. Full complement of mine-rescue equipment is maintained at central station for use at all mines.

Personal equipment and ample water for fire-fighting increase safety



HOW DRAINAGE can be diverted to provide fire-fighting water by pumping into the mine rather than to the surface.

Thus, if water will control the fire, it is available in quantity at adequate pressure.

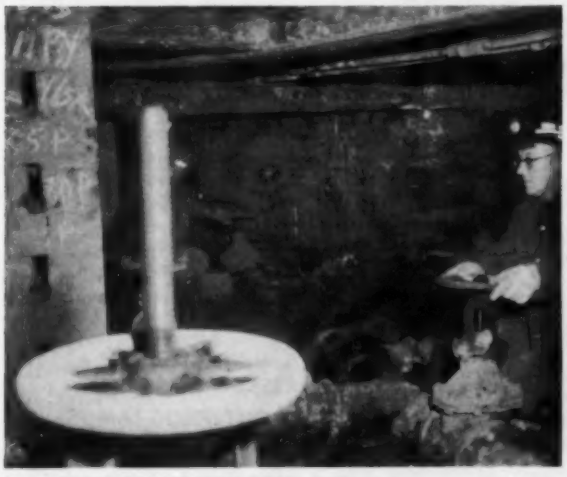
PORTABLE FIRE CARS INCREASE PROTECTION

Even with water lines in the sections a situation may arise in which greater volumes of water at higher pressure may be required to prevent the sperad of a fire. In Mathies mine there are six track-mounted fire cars, four of which are new units built by Mine Safety Appliances Co., expressly for underground use. These are stationed at strategic points along the main haulageway from where they may be rapidly hauled by locomotives to points of need.

Each of the new cars has a capacity of 2,200 gal and a pump which produces a discharge of 120 gpm at 100 psi at the end of 600 ft of 2-in hose. The older cars have a capacity of 1,000 gal each, providing 100 gpm at 75 psi through 500 ft of 1½-in hose. All cars carry the necessary nozzles, fittings and tools and either 600 or 500 ft of hose, as described. Their purpose is to supplement the early fire-control efforts which depend upon the use of water from the section pipelines.

Effective communication is required if the full potential of the cars is to be realized. Each loading head is equipped with a telephone, and all

FIRE-HOSE OUTLETS, tapping large-diameter mains, are 500-ft apart along main road and 250-ft apart (at loading points) in working sections. Fire hose is stored in emergency-supply stations and carried on fire cars.



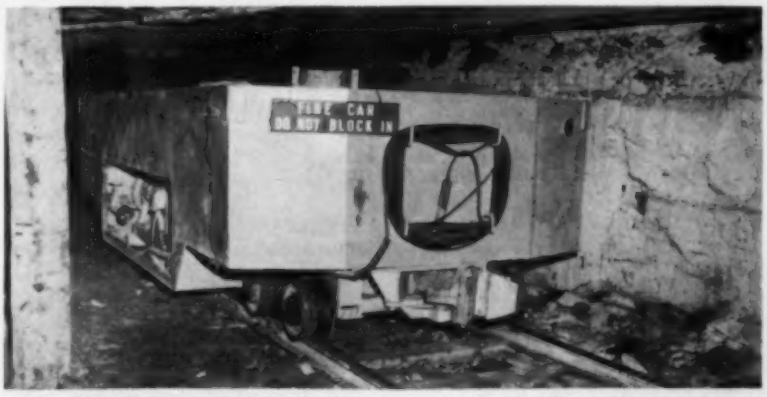
WATER SYSTEM provides for pumping water to surface under normal conditions or pumping water back into workings in case of emergency. Valves on mains in portal area can be manipulated to make the necessary diversion.

haulage locomotives are equipped with Minephones. A call to the lamp room attendant through either channel of communication means that the locomotive closest to the point of need will be diverted to haul in the closest fire car.

MAINTAINING AUXILIARY EMERGENCY EQUIPMENT

The fire-control problem in coal mines cannot be solved by water supply only. Other extinguishing agents are required, since fires may have electrical or hydraulic-oil origins. Rock dust and chemical extinguishers are protection against these possibilities.

Each working section is provided with a minimum of three 20-lb Ansul



REFLECTIVE SIGNS identify all fire-control installations. The fire car is stationed near one of the portals. Upon receiving an emergency call, the closest locomotive is assigned to haul car to scene of action.

DuGas dry chemical fire extinguishers, a 150-lb portable unit of the same type and a minimum of 1,000 lb of rock dust and a Bantam rockduster. The 20-lb units are also installed on all locomotives, cutting machines and drills and at electrical installations along the main haulageway, and 150-lb units are ready for service in all portal areas. Pumping stations, ventilation doors, trolley and feeder line switches and oil storage points each are provided with 240-lb stocks of rock dust. The bags of rock dust are placed in polyethylene bags to keep the dust from caking.

Facing the possibility that these fire-control measures might fall short, the company constructed emergency stations about 2 mi apart along the main haulage road to permit the storage of emergency supplies for erecting seals.

In the matter of equipment and supplies, 15 Self-Rescuers are kept in each working section and caches of two Self-Rescuers are installed at 2,000-ft intervals along the main haulage road. Reflective Scotchlite signs have been posted at each of the fire-control equipment locations, as shown in the accompanying illustrations.

All this equipment is only of value if it is properly used. Pittsburgh Coal follows through by providing the training the men will need in properly handling a fire emergency.

BUILDING DISCIPLINE FOR MINE-FIRE EMERGENCIES

The emphasis on developing effective fire-control procedures comes from Pittsburgh Coal's top operating management. Each mine management assumes the responsibility for putting the program into effect at its operation, with the company's Director of Safety coordinating the efforts. The staff of the Safety Department includes three safety inspectors and an instructor in mine-rescue and first-aid training.

On-the-job training in fire-control discipline is handled by the inspectors. One of their primary duties is to visit each production crew at regular intervals to instruct or refresh the men in how to use the equipment at hand. Primary goals of the training are (1) to eliminate tendencies to panic upon discovery of a fire, (2) to make certain that every fire will be attacked with all the facilities available and (3) to inform the men of how the full resources of the company will be brought in to back them up.

In training the crews, the inspectors make a point of the fact that fighting a mine fire upon discovery is not the most dangerous of pursuits. It is much more dangerous to try to get back to fight a fire after it has been left to get out of control. It is even more dangerous if the unattacked fire makes it necessary to seal off the fire area. The men are told that if this state of affairs comes to pass, they will long since have been evacuated from the mine. Therefore, the best thing they can do is to take immediate steps to control and confine a fire because their actions within the first 15 min after discovery of the fire are critical. Soon thereafter reinforcements will arrive to help them.

These are the instructions given to men to guide them if they should have a fire in their own section. There is the other possibility, however, that the fire may be in some other section. The crew-in-training may then be subjected to smoke without knowing where the fire is. If such is the case, the men are instructed to provide themselves with Self-Rescuers from the section supply and to proceed toward the main entry.

Within the past few years, Pittsburgh Coal has converted from room-and-pillar methods to a multiple-entry system of mining. One of the advantages is that all headings but one in the multiple entry are on intake air, some ventilated by permitted leakage through doors in the headings. Thus, the men have the clearest possible route of exit if they are subjected to smoke from a fire of unknown location. They are advised to take sledges and other tools since they may have to break through a stopping to get around a fire into the main escapeway. The proper actions to be taken in each section are fully explained to the crews working that section.

Proper procedure in fighting a fire, as explained to the men, is to use the 20-lb extinguishers first to keep the flame down while the fire car is being hauled in. If these become exhausted before the fire car arrives the 150-lb extinguisher is brought into play. The stream from the 150-lb unit is played intermittently to ration the charge, and rock dust and water from the spray lines are used to supplement the chemical agent.

The section foreman is authorized to take charge of these emergency measures. He is instructed to assign men to fight the fire according to the foregoing instruction, to assign another man to remove the nips, another to clear the road for the approach of the fire car, another to telephone the lamp house attendant from the loading point to send the fire car.

COMPANY ORGANIZATION FOR FIRE CONTROL

The safety inspectors take turns as fire marshals during idle periods such as weekends. Firebosses and others patrolling the mine are instructed to call these men, through telephone answering service, in case of emergency. This is an indication of the extent to which Pittsburgh Coal Co. has organized company resources to back up the efforts of the men in applying the firefighting equipment. Specified duties have been assigned to production and safety officials, and charts are posted at each mine detailing the specific duty of each member of management.

MINE RESCUE FACILITIES ROUND OUT PROGRAM

A well-equipped mine-rescue station is maintained by Pittsburgh Coal Co. at Montour No. 4 mine, under the supervision of the mine-rescue instructor, who trains the company's rescue teams and inspects and maintains the equipment. Thus the company is fully prepared to fight fires if at all possible or to recover sealed sections if the circumstances should arise. The station is equipped with McCaa and Chemox apparatus and with equipment needed to keep them in top condition. Power driven pumps have been installed for refilling oxygen cylinders for the MaCaa units and hand pumps are kept in good condition for actual use underground.

The interest of Pittsburgh Coal Co. and affiliated companies in these matters has rebounded to the benefit of others. The accompanying photo in the mine-rescue station was taken within an hour after the apparatus had been returned from actual use at a mine operated by another company.

Four Steps to Better Mine Fire Control

1 **Provide adequate water supply in face areas**

2 **Maintain up-to-date equipment for emergencies**

3 **Train men to act quickly upon discovery of fire**

4 **Organize management and supervisory duties**

BIT CONTROL SHEET

Mine _____ Bits _____ Day or Month of _____

Sec-	Crew	PLACES		BITS DULL		BITS LOST		BITS DISCARDED		BITS CONSUMED		BIT CONSUMPTION			REMARKS
		To Day	To Date	To Day	To Date	To Day	To Date	To Day	To Date	To Day	To Date	Bits Per Place	Tons Per Bit	Tons Per Bit To Date	

Lower bit costs depend upon proper and timely reconditioning and upon inventory controls like this.

Maintaining Mining Bits

HOW DO YOU KEEP carbide mining-machine bits in proper condition for use? If they are merely removed and reground at convenient intervals, chances are that money is being wasted. Although bits are expendable the adoption of best maintenance practice has been known to double the life of bits, greatly improve their performance and cut costs proportionately.

An improvement of this magnitude must include preventive maintenance, starting with the proper selection of bits and bit materials to suit operating conditions and the needs of the machine on which they are used. This is a mining engineering problem and not a purchasing-agent search for the cheapest bit available. Various carbide grades and styles of tools are offered by all manufacturers of carbide mining tools.

Rules for maintenance would be easy to formulate if it were not for the fact that coal seams differ, even in the same mine. However, a universal rule is applicable: A sharp bit does the work faster and with less power. Excessive power demands on machines cause premature failure of machinery parts and higher production costs per ton of coal. Consequently a practice of establishing bit changing schedules by mine supervisors is recommended.

By E. H. Johnson, Sales Manager
Mining Divsion, Kennametal, Inc.
Bedford, Pa.

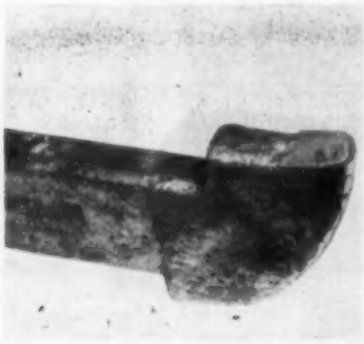
Bit changing schedules must be fitted to individual conditions but also must be flexible because even with a set schedule, wear rates vary, and chipping or breakage occurs. Bit "spotting" is also required as a maintenance procedure and guide for scheduling. It will stop coring, overloading other bits, and overloading and slowing production of the machine. Also, dull bits are more likely to be smashed if they are not replaced. Bits should be replaced when a land of approximately $\frac{3}{32}$ in across the cutting edge has been produced by wear or when the machine is overloaded and slowed in cutting by dull tools. Supervision is required for proper observance of these rules for several reasons. Excessive wear and tool failures may be caused by changes in characteristics of the coal seam or by improper maintenance of the mining machine. Certainly proper bit maintenance depends, in part, upon proper maintenance of the machine. For example, an instance is known where bit costs on a section were reduced to less than half after new cutter chains were installed. Broken guides, broken or missing set screws, and badly worn set screws also reduce tool performance. Chains must be properly laced in order to divide the work properly among the bits.

Care in selection of men to do the grinding is also important to proper maintenance. Slip-shod jobs in the grinding shop can be costly. Therefore, these men should have enough intelligence, interest in their work and reliability to do the job properly and to keep records which may be used as guides in minimizing maintenance costs. A good record form, such as the one illustrated, simplifies the job.

More on Cutter Bits ►

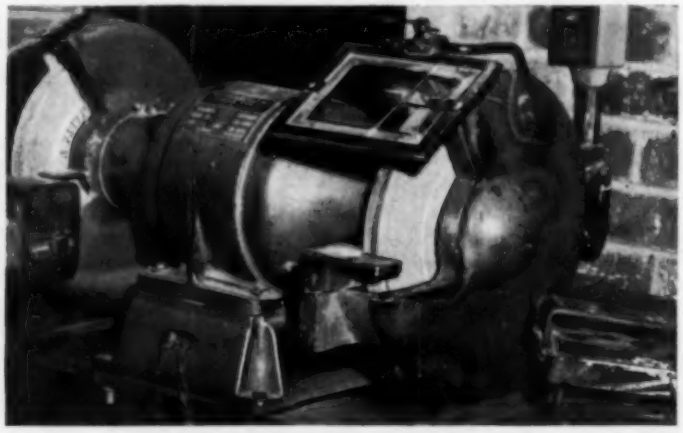
Bit Maintenance — by E. H. Johnson

Cutter bits need attention when the wear is one-third the thickness of the insert and the land across the cutting edge is $\frac{3}{32}$ in, like these. Though not overly dull, continued use would reduce service life.



When a carbide bit is used too long after it is dull the face may be cratered. This fault can be removed by grinding the face. However, an undamaged face of this type of bit should never be ground.

A bit with severe edge wear can be restored for more useful service by grinding out much of the stock and then grinding the insert to its original shape, as shown on the reconditioned bit above.



Any double-end pedestal or bench-type grinder stand for a 10-in wheel with a 1-in face is satisfactory. Grinding rests are recommended for cutter bits. Wheel speed should be at least 1,700 rpm, and work should be well lighted. When grinding dry, a suction-type dust remover is strongly recommended. In wet grinding, water should flow over the entire grinding-wheel surface in a steady stream to insure best results.

Proper grinding of cutter bits at right time increases useful life

The steel shank of the bit is ground first. Only enough stock is ground off for bit clearance. Clearance angle is kept the same as on new bits to assure adequate tip support. Moderate pressure and continuous rotation of the bit on its rounded contour contribute to grinding efficiency, longer wheel life and cooler wet or dry grinding. A 60-grit aluminum-oxide wheel should be used for steel grinding, and wet grinding is recommended to get the advantages of lower temperature, higher speed and arrested dust. Thermal shock by quick heat from grinding or by quenching a hot tool should be avoided to prevent hairline cracks in the carbide tip, which expands about one-third as much as the steel shank when heated.

First step in reconditioning an auger drill bit (Style D) is to grind proper clearance under the tip with an aluminum-oxide wheel. Its original shape is recommended for average or medium drilling. Angles for this and other conditions are shown in the diagram. The bit should be rotated on the wheel to produce these angles.

The least possible amount of steel should be ground with the silicon-carbide wheel because it loads and glazes the wheel necessitating more frequent dressing. For dry grinding, Kennametal recommends Bay State IC 80-18-V2, Norton 39C801-J7V, Carborundum GC80—H8-V5 or equivalents. For wet grinding, a harder wheel should be obtained.

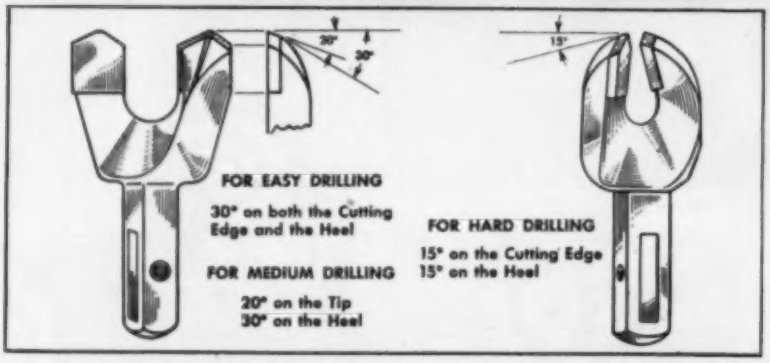
Silicon-carbide wheels must be dressed frequently with a star dresser to keep sharp crystals of silicon-carbide exposed by breaking down the bond and to keep the surface free from glaze.

More on Auger and Roof Bits ►

An auger-type drill bit needs reconditioning when the wear land at the worst wear point does not exceed one-third of the insert thickness. To produce its original shape the depth of the grind should be the same along the full width of the insert. If one is worn more than the other, both tips should be ground to equal length.

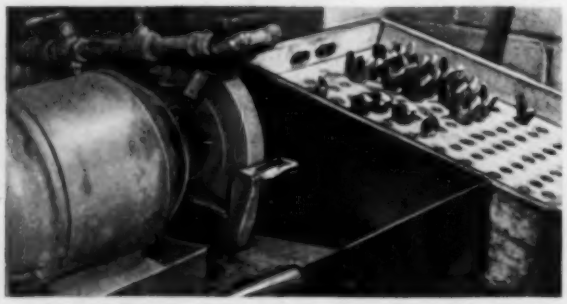
The cutting edge is ground by a back and forth motion across the whole face of a silicon-carbide wheel, grinding first the left and then the right sides of each insert. Pressure is controlled to assure a uniform finish and prevent overheating. Note the protective gloves, and goggles should be worn while grinding.

Tip of the bit is ground on a silicon-carbide wheel. Either a flat or grooved wheel may be used, but for best economy grooved wheels are used only to finish bits. However, it is easier to use a grooved wheel because the bits stays in the groove and less rotation of the bit is required. In either case, the bit should be rotated enough to produce a cutting edge having the approximate curvature of a new bit.



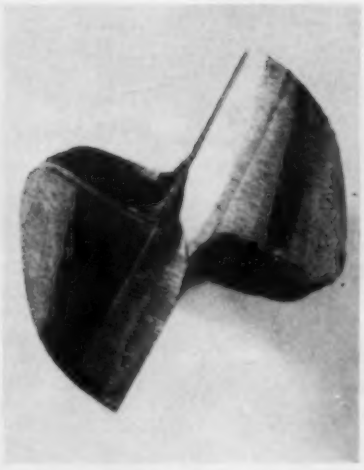
Good grinding reproduces original shape and angles of a new bit

A slight chamfer on the cutting edge of the bit is a good idea. Grind it like this.



Bit holder keeps reground tips apart for protection of inserts and facilitates inventorying.

Roof-drill bits should be reground when the edge is flattened about one-third to one-half insert thickness.

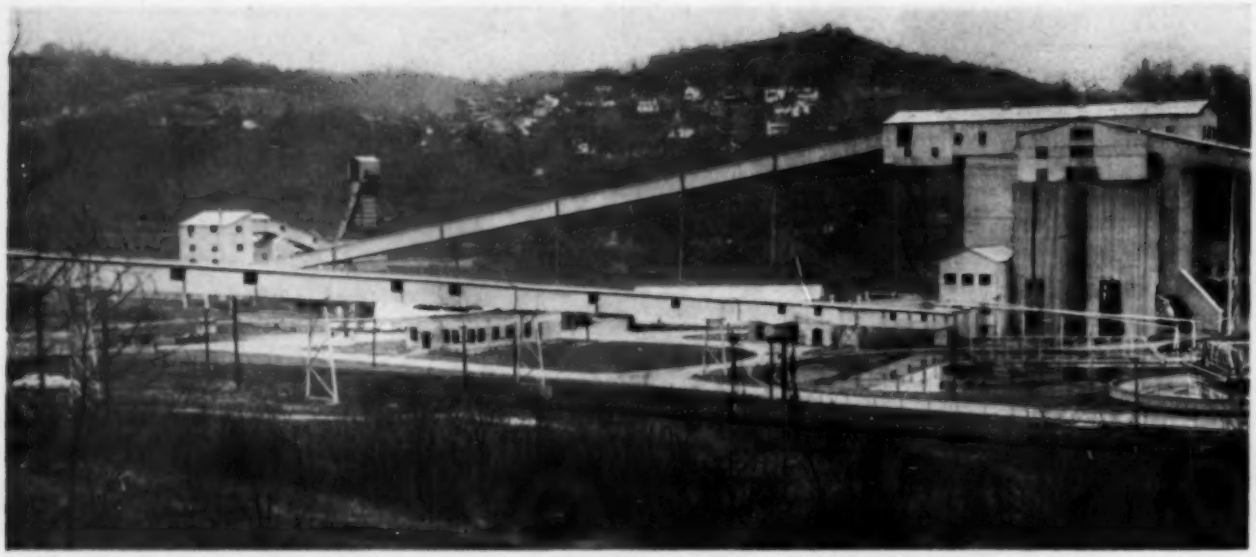


The cutting edge is ground on a silicon-carbide wheel to a line to produce both proper cutting-edge angles and clearance angles, using a back and forth movement across the face of the wheel. Bit should not be rolled.

Maintaining adequate support for the insert is important in grinding

This clearance on a reground bit should be held as near as possible to the original shape in order to maintain adequate support for the tip. The bit should be rotated on the wheel to produce this shape.

A light chamfer on either side of the apex reinforces the point and gives longer life. The harder the formation to be drilled, the more important is this chamfer. Outside edge of the insert should not be ground.



STARTING POINT in J & L's giant Vesta-Shannopin refuse-disposal system is two 1,200-ton silos. System has handled

Big-Volume Refuse Disposal

Stationary and portable belt conveyors can spread 750 tph of material in predetermined pattern in spoil area over 1 mi from plant.

DISPOSING OF 9,000 TONS of refuse every two shifts over a period of 6 yr without a major breakdown is an outstanding achievement at the giant Vesta-Shannopin preparation plant of the Jones & Laughlin Steel Co. This materials handling job was done by an unusual system of stationary and portable belt conveyors that moves rock 1 mi across country and stacks it systematically in a disposal area.

Up to the first of this year 10,900,000 tons of rock had been spread out in the disposal area at a total cost of only 8c per ton of rock. Of this total, operating and maintenance cost is 2c per ton. The company plans to store 38,000,000 tons of refuse in the area over a period of 45 yr.

On April 8, 1957 production from the Vesta mine was decreased and a portion of the output from the Shannopin mine was started through with the Vesta coal. As a result, J & L

HEATED GALLERY covers each of two stationary 36-in belts carrying rock 2,300 ft to the edge of the spoil area.

TRANSFER STATION at discharge end of stationary belt diverts rock to portable conveyor on track.

9,000 tons of rock in two shifts.

FEEDERS under silos deliver 8x0 rock to 48-in belt discharging to crusher.

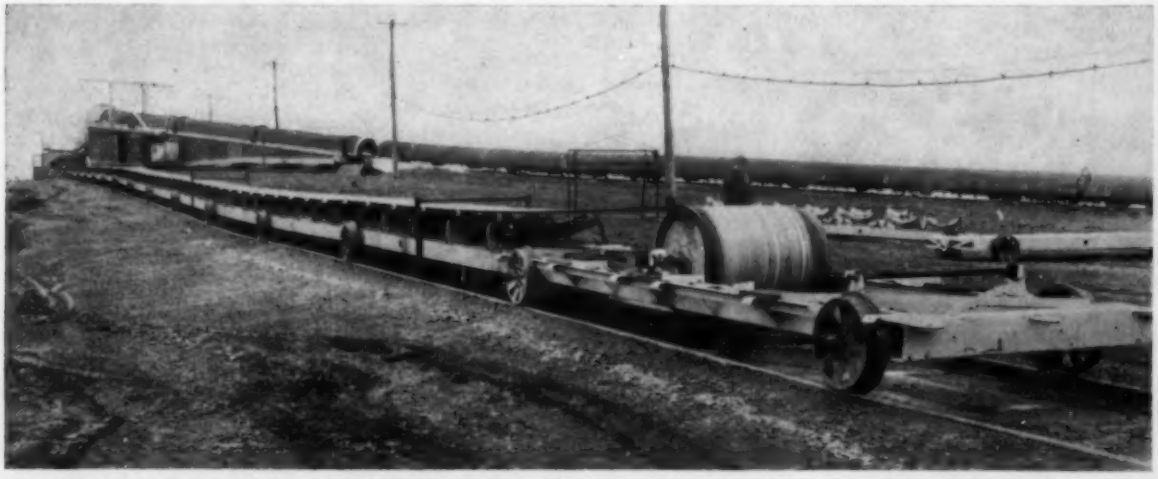
at Vesta-Shannopin Plant

estimates that refuse from the plant now will be approximately 5,000 tons per day and the life of the dumping area will be increased to at least 45 yr.

When J & L began to mechanize its mines in 1944, the company believed that with selective mining the coal from Vesta Nos. 4 and 5 mines would be clean enough to be processed in the existing plants. But even with careful supervision the increase in refuse was so great that the plants could not handle it. Large tonnages of refuse were being hauled, a reject disposal problem was created and valuable metallurgical coal was being lost. Selective mining also prevented underground equipment from operating at peak efficiency.

After a thorough analysis of this problem, the company decided that a new preparation plant should be built near the mines to process full-seam coal from both Nos. 4 and 5 operations. From the viewpoint of haulage and operations, the ideal site would be as close as possible to old No. 5 tipple near Vestaburg.

Since large volumes of rock would have to be handled as a result of full-seam mining, refusal disposal rated top consideration in choosing the new site. With full-seam extraction the company expected to mine 14 to 16 in of draw rock with an average of 78 in of coal. The only area near Vestaburg large enough for rock disposal was across the Monongahela River at LaBelle. Another advantage offered by this site was that construction could be done



TRAILING CONVEYOR behind stacker belt is set at slight angle to first portable conveyor to permit uninterrupted flow of rock as stacker advances or retreats. Wheel-mounted conveyor sections are added after each 200 ft of advance.

HEATED dribble chutes and transfer stations prevent formation of ice at these critical points in cold weather.

PIVOT POINT of stacker connects to crawler-mounted drive of portable conveyor. Leveling is done automatically.

CONTROL CENTER for the entire disposal system is housed in cab over crawlers of the stacker boom.

PORTABLE transformer steps down 4,160-v power from pole line to 460 for operating drives.

without interfering with the No. 5 plant.

Construction started in 1947 and was completed in the spring of 1950. The plant is designed to process 2,400 tph of raw coal containing 30 to 35% refuse. Cost of the outside buildings and equipment was nearly $14 million. Total cost including improvements and changes was $21 million. The refuse-disposal system alone cost $1,800,000.

SELECTING A DISPOSAL SYSTEM

At the time the new multimillion dollar plant was being designed the following facts were known about the refuse-disposal job:

1. The rock-disposal site would be about 1 mi from the loading point at the plant and 247 ft above the plant ground level.

2. An average of 9,000 tpd of refuse would have to be transported in 14 hr, or 750 tph.

With these facts, the company analyzed four different systems for handling the rock. These were:

1. A continuous aerial tram 6,000 ft from the plant to the disposal area, using shuttle trams in the disposal area.

2. A 6,000-ft belt system, with trucks or aerial trams to spread the rock at the dump area.

3. A truck road, about 1 mi long, between the plant and disposal area.

4. A continuous belt system from the plant to the disposal area with a stacking system to pile rock in a predetermined pattern.

Each system was studied from the standpoint of first cost and operating expense. The belt system and stacker combination appeared to be best, and therefore was selected for the J & L job. Engineers of the Jeffrey Mfg. Co. co-operated with J & L's engineers in the design of the system.

WHAT THE SYSTEM INCLUDES

The 750-tph system is made up of stationary and portable belt conveyors. Refuse is fed to the system from two 1,200-ton silos. Stationary trucks carry rock from the plant uphill to the edge of the disposal area. There it is discharged onto a series of two portable units that carry it to a stacker that distributes the rock in

STACKER with cantilevered boom piles rock in 180-deg arc 370 ft wide and on 0 to 10% grade. Self-propelled unit can pile rock 25 ft high.

a predetermined pattern. Stationary units include two 36-in belts, 1,100 and 1,200 ft long. These belts, called M-1 and M-2, are housed in heated covered galleries and the drives are enclosed in heated buildings. Portable units include the D-1 conveyor which is 1,275 ft long; the S-1 belt which extends 3,600 ft; and the stacker, S-2 which measures 171 ft from its pivot at the end of S-1 to the point of discharge.

The stacker conveyor has a cantilevered boom that permits discharging over the end of an advancing pile. It can pivot 180 deg from its loading point while making a semicircular pile 370 ft wide on a 0 to 10% grade. It can pile the rock 25 ft high. If the boom is elevated more than 10 deg power is automatically cut off. There also is automatic leveling of the S-1 drive and the hopper to the S-2 stacker. The unit is self-propelled on crawlers which support the boom near its midpoint. Operation of the refuse conveyor system is controlled by one man stationed at a pushbutton panel housed in a cab over the crawlers.

Behind the stacker boom is the trailing conveyor, S-1, whose drive also is mounted on crawlers straddling 60-lb track on wood ties. The drive is kept level by an automatic hydro-leveling device. The conveyor is built up from 20-ft intermediate sections, each mounted on two wheels. These are pin connected by male and female clevises and travel on the steel track behind the drive.

The S-1 trailing conveyor is set at a slight angle to the M-2, or second, permanent conveyor coming up the hill from the plant. Thus the S-1 unit can advance with the stacker while refuse is dropping on it from the transfer hopper. When the trailing conveyor has advanced 200 ft the belt is separated at a splice and the wheel-mounted tail pulley is pulled back to the starting point. Conveyor sections are added and 400 ft of belt is spliced in. It takes one shift to add 200 ft of conveyor and belt. This trailing conveyor unit is now 3,600 ft long.

To prevent wind from lifting the belt off the idlers and also to provide protection against freezing and frost, the trailing conveyor is covered with semicircular sections of corrugated sheet metal covers with curtains extending to the ground.

Crawlers on the portable drive are driven independently by 15-hp gear motors at speeds ranging from 12 to 15 fpm. Steering is done by varying the speed of the individual crawlers. To provide additional flexibility for relocating the drive of the trailing conveyor, each crawler can be turned 10 deg.

Drives on all belt conveyors are tandem units and are powered by one 125-hp and one 30-hp wound rotor motors. Each of the motors drives a separate pulley at the same speed. Because belt tensions are near peak permissible values, power is applied first to the 30-hp motor while the conveyor accelerates and then the 125-hp motor cuts in. All motors are provided with thruster brakes to prevent backward movement when power is off. Gravity takeups are used to maintain the proper tension in the belts.

MOVING THE PORTABLE UNITS

When the trailing conveyor reaches its limit in one direction, the stacker may load or retreat or be relocated. Relocating is done by disconnecting the trailing-conveyor drive and moving it and the boom as a unit to the new site. The 20-ft sections of conveyor are separated and picked up by a crane and carried to a previously prepared 450-ft length of track laid along a projected dumping line. After the 450-ft section of track was prepared for the new setup a 200-ft section of conveyor was assembled on it so that the drive could be connected as soon as it was trammed into place.

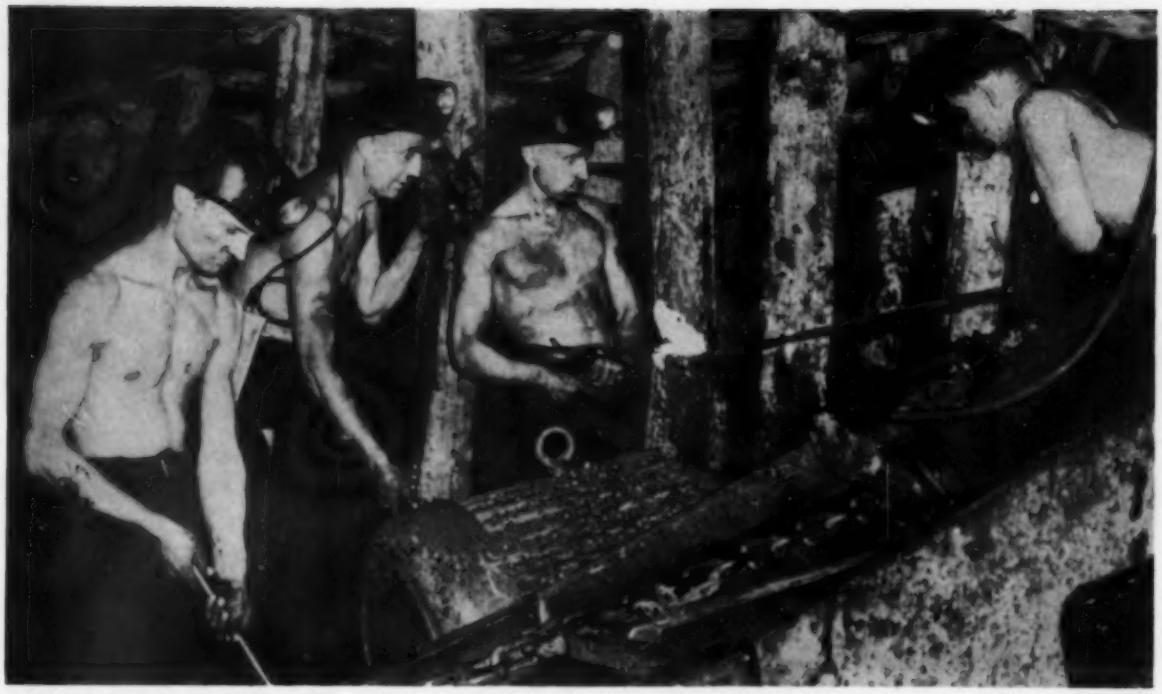
OPERATING CREW

The refuse disposal equipment is operated and maintained by seven men on each shift. One man operates the stacker from the control room on the stacker. He can stop the entire system from his cab. Two conveyor men patrol the complete system and clean up any spilled refuse along the way. One man is stationed at the crusher to control the feed to the belt system. An ammeter on the short feeder belt shows him what load is flowing to the system. Two repairmen keep additional sections of conveyor ready to be installed in the S-1 trailing conveyor, lay track ahead of the drive and inspect belt splices. The seventh member of the crew is a bulldozer operator who uses a Caterpillar D8 unit to clear brush ahead of the stacker and cut benches in the hillside when rock is being spoil on a downhill slope.

OPERATING EXPERIENCE

In over 6 yr of experience with the disposal systsem, J & L has gathered some valuable experience. For example, it learned that 80 ft is the maximum depth to which rock can be piled in one pass. A greater depth causes slides that could endanger the S-2 stacker conveyor. The company also learned that when dumping rock on the downhill grade of natural terrain it is necessary to bench the hillsides to prevent slides.

The company has taken several other steps designed to keep the system operating smoothly. To protect all belt carcasses from damage by tramp iron a magnet was placed in the preparation plant. To prevent moisture from freezing on dribble chutes and belt-drive pulleys, heaters were installed at critical places. Dribble chutes are protected by strip heaters mounted in insulated boxes. Oil heaters prevent the formation of ice on drive pulleys.



RISING COAL SUPPLIES for home consumption and a surplus for export result from Poland's campaign to increase mechanization and to bring new mines into production.

Coal in Poland

By JERZY DZIERZYNSKI, Director
Planning Office for Fuels and Power
Polish People's Republic

Confidence in its growth opportunities and in the marketability of its product pervades the Polish coal industry, which may provide the top competition to U. S. coal in overseas markets. Here is a first hand report by a Polish mining engineer.

HAVING BENEFITED FROM MY STAY in the United States with a technical delegation of Polish mining engineers, I would like to share some of my knowledge of the Polish coal industry with the readers of *Coal Age*. The industry is very important in the Polish economy, and is connected with the economies of other countries through our exports of coal and coke.

We shall speak mainly of hard coal, although Poland also produces lignite or brown coal. Poland holds fifth place in the world and third place in Europe in production, and second place in the world, next to Great Britain, in per capita output. The figures for 1955 are as follows:

	Production, Million Short Tons	Production per Capita, Short Tons
United States	494.0	3.97
USSR	303.7	1.52
Gt. Britain	248.1	4.80
West Germany	145.1	2.94
Poland	104.0	3.47
China	103.0	0.18
France	60.8	1.42

Third place in per capita production, after Poland, is held by Belgium, 3.33 tons per inhabitant. [All tonnage figures in this report are expressed in short tons, and metric quantities have been converted into their English equivalents.—Ed.]

RESERVES AND GEOLOGY

Reserves of hard coal in Poland, located in depths up to 3,280 ft, amount to about 88 billion tons, making Poland fourth in wealth of coal reserves after the United States, Soviet Russia and China.

The coal is concentrated in two basins, the Upper Silesian and Lower Silesian, of which the former is by

far the larger. Upper Silesian is located in southwestern Poland, while the lower basin is farther to the north at the foot of the Sudeten mountains. The deposits are of the Carboniferous era.

Coal reserves in the upper basin suitable for exploitation represent a total seam thickness of approximately 558 ft, in individual seams from 2.3 ft in thickness to more than 65 ft. The seams are not as regular as those in the United States; they are wavy and their continuity is interrupted. Dip varies between 3 deg and 20 deg, and the seams are interspersed with layers of sandstone and slate. In some places the coal almost reaches the surface. In others, it is covered with water-bearing triassic strata.

Although extraction is more difficult than in the United States, it is generally easier than in other European countries. Besides the coal is of good quality, its fuel value ranging between 9,000 and 14,100 Btu per lb. The fuel coal is very hard and therefore suitable for long-distance transportation. Coal from the western part of the basin can be converted into metallurgical coke.

The lower basin is surrounded by mountains and its geographic conditions are more difficult, but almost all layers provide good coking coal. Rock pressure in Polish mines is high, as in other European basins, making it necessary to provide reinforced support and to drive narrow openings, generally not more than from 6 to 10 ft wide.

RECENT HISTORY OF POLISH MINING

The coal industry in prewar Poland did not include the entire coal-producing area which belongs to Poland today. A part of the Upper Silesian Basin and the entire Lower Silesian Basin were located outside the boundaries of Poland. Conditions for development of the industry were not favorable because the country was little industrialized and there were difficulties in exporting coal in face of strong competition from other countries.

The situation is best characterized by the fact that, with the exception of the favorable economic atmosphere in 1929, the coal industry never reached the production level of 1913.

Here are the figures:

Year	Production, Million Short Tons
1913	45.1
1919	27.8
1929	50.8
1937	39.8
1938	30.9

During the war, Hitlerite Germany exploited the mines ruthlessly to satisfy its military needs, plundering the best layers of coal with complete disregard for the future of the mines. After the war, Poland took over mines which, it is true, were not destroyed by direct action, but which nevertheless were devastated. Some of them were inundated as a result of military action. In addition, almost the entire German technical staff had left and had to be replaced by Polish personnel.

A large number of Polish engineers and technicians perished during the war as a result of military action as well as in concentration camps. The Mining Academy and mining schools were closed for more than 5 yr; therefore, new young personnel was not available. Older workers were dying faster than normal as a result of wartime conditions. Furthermore, Poland had to take over mines which were not located in Poland before the war. Their capacity was approximately half the capacity of the mines in old Poland.

There were no small difficulties in taking over and controlling coal production in 1945, but the enthusiasm and efforts of the workers, technicians and engineers were such that the task was fully completed. In 1938, coal mines in the present territory of Poland produced 76.3 million short tons.

Figures on post-war production are:

Year	Production, Million Short Tons
1945	30.0
1946	52.0
1947	65.0
1948	77.3
1949	81.5

Thus pre-war production was exceeded in 1948. In the following years, production increased at a somewhat slower rate of about 4.4 million tons per yr. In 1955 production reached 104.2 tons. The slower rate of increase in that period, which was the period of the Six-Year Plan, reflected the fact that in the period from 1945 to 1949 it was easier to put reserve mines into production. Later on it was necessary to expand basic installations of existing mines or to build new ones. In 1956 production reached only 104.7 million tons because conditions were particularly difficult at that time. According to estimates, coal production will continue to develop in such a manner that by 1960 it will reach 115.5 million tons.

PROBLEMS OF PRODUCTION

The largest Polish mine, Bobrek, produces 9,570 short tons per day, but average production per mine is approximately 3,850 tons per day (24 hr). Depth of the seams, the lay of the seams and other natural conditions make extraction more difficult than in the United States. The following table gives production in 1955 by depth, seam thickness and seam inclination. (3.28 ft = 1 meter.)

Depth		Thickness		Inclination	
Feet	Percent	Feet	Percent	Degrees	Percent
Under 328	3.2	Under 3.28	8.6	Under 3.	1.5
328–656	16.6	3.28–6.56	37.6	3–6	22.0
656–984	24.0	6.56–9.84	15.4	6–10	37.7
984–1,312	26.3	9.84–13.1	10.0	10–15	10.1
1,312–1,640	16.8	13.1–16.4	8.6	15–20	11.2
1,640–1,968	8.4	16.4–23.0	9.0	20–25	5.2
1,968–2,296	4.0	23.0–29.5	5.2	25–30	5.1
2,296–2.624	0.7	29.5–49.2	5.1	30–35	3.5
	100.0	Over 49.2	0.5	35–40	1.5
			100.0	40–55	1.8
				Over 55.	0.4
					100.0

As the table shows, only 20% of the coal is extracted at depths up to 656 ft, 50% at depths of from 656 ft to 1,312 ft, and 30% at depths greater than 1,312 ft. Only 15% of the coal is extracted from seams with 3-deg inclination, which is prevalent in the United States, and over 40% is extracted from seams exceeding 10 deg in inclination. With respect to methods of extraction, the longwall system predominates, accounting for 52% of the 1955 production. The remainder comes from development work and room-and-pillar mining.

Heavy rock pressures make it necessary to reinforce openings with metal or wood supports. The distance between individual supports is not more than 1 yd, and overhead lining is required.

Most openings are approximately 6 ft wide, main openings are 9 ft wide. Size of the openings is a decisive factor in mechanization since it governs the size of the machinery that can be used.

In providing access to the seams, it is necessary to construct a large number of openings through rock, either

shafts or inclined openings. The freezing method is used where large amounts of water are present.

The highest rate of advance is 279 ft per mo in shaft sinking, 869 ft per mo in rock openings and 1,378 ft per mo in coal. Rock tunnels are partly equipped with efficient loading machines. Coal galleries have drilling machines and the coal is loaded into mine cars by scraper conveyors which are loaded either manually or mechanically. Where longwalling is used the basic machinery is the longwall cutting machine and the scraper conveyor. Longwall combines and cutter-loaders are used where conditions are favorable. In 1955, 33% of the coal was extracted mechanically. The remainder was extracted by using dynamite and hammer. Approximately 18% of the loading was done mechanically in 1955. These are not high figures but they are increasing each year.

Because of the inclination of the openings the cars can rarely be taken all the way to the face. In such instances light scraper conveyors are used to feed a conveyor belt which discharges into the wagons. Most wagons have a capacity of less than 2 tons.

Explosives are used most often in breaking coal. Airdox is not used, although a few mines use Cardox. Also employed is a new system of hydraulic extraction, in which water under pressure is used and the coal is thus transported to the main tunnels or shafts.

In the Upper Silesian Basin, where the seams are thick and located below inhabited places and industrial establishments, the openings left after coal is extracted are filled with sand which is transported to the bottom of the pit with water in tubes. This hydraulic backfilling is a special system used almost exclusively in Poland. It requires good quartz sand in an area close to the mine. This sand now is transported on a railway built for the purpose after the war.

Such are the general working conditions in Polish mines. Labor productivity is much lower than in American mines. In 1955 productivity was approximately 1¾ short tons per man day. Nevertheless this productivity was the highest in Europe, although productivity in British and German mines was not much lower.

The Polish coal industry employs approximately 250,000 workers, and the number increases each year. Construction of housing and other cultural installations is a serious problem. A new mining city, Nowe Tychy, is under construction, and a number of settlements are being built in various parts of the basin.

Miners in Poland have special privileges as compared to other workers. They receive higher wages and a special bonus each quarter. When they reach the age of 55 yr, and complete at least 25 yr of work in the mines, they receive a pension representing approximately 40% of their average wages. They are also provided with medical care in the event of accident or sickness.

ORGANIZATION OF THE INDUSTRY

Coal mines were nationalized after the war in a similar manner as other large enterprises. The mines are under the general administration of the Ministry of Mining and Power.

Coal mines are separate state enterprises with their own economic budget. They are grouped in the so-called "Zjednoczenia," representing a single management. The Zjednoczenia can be compared to companies in the United States. At present there are seven such companies in the hard-coal industry and one in lignite. The ministry controls also several Central Bureaus, whose task is to develop new mines and expand existing ones, to carry out prospect drilling and to produce mining machinery. The production of construction materials for mines and of some other materials required by mines is also controlled by the Ministry of Mining and Power. The ministry has at its disposal two Scientific Research Institutes to pursue coal-mining studies. The Central Office for Coal Distribution, "Centrala Zbytu Wegla," is responsible for coal sales in Poland.

The Higher Bureau of Mines, "Wyzszy Urzad Gorniczy," supervises security measures in mines. Its president is directly responsible to the chairman of the Council of Ministers. Its agencies are district bureaus of mines, "Okregowe Urzedy Gornicze." One of its duties is to protect the reserves of coal by assuring that losses are not unnecessarily great.

INVESTMENTS IN COAL

There were no new mines developed in Poland in the period between the two World Wars because there was no outlet for the coal. Construction of 10 new mines was begun after World War II. Five are in production. In addition, more than 20 mining installations were put into operation. The amount of labor invested in them represents the labor necessary for building a new mine. A number of new installations were built at old mines. These increased production or replaced old machinery, such as, extracting equipment, conveyor belts, coal-dressing plants, ventilators and so on.

In the northwestern and central parts of Poland there are shallow layers of lignite, having heating value from 3,600 to 5,400 Btu per lb. The lignite layers are covered with clay and sand. At present we have three open-cut mines and several small deep mines in production and an open-cut mine under construction. Annual production is over 6 million tons. It is estimated that production will be over 11 million tons in 1960. This development will continue, mainly in order to provide power.

The development of this industry will depend mainly on discoveries of coal layers sufficiently shallow to make open-cut mining possible. According to our present estimates, the ratio of cover to coal must not exceed 7:1.

PROBLEMS IN DISTRIBUTION

In the period before the war, the problem of outlet was more pressing than that of production. Internal coal consumption in Poland, as a result of low industrialization and poverty in rural areas, was only 1,100 lb per inhabitant, while at the same time Great Britain and Belgium consumed up to 8,800 lb per inhabitant, Germany up to 5,830 lb per inhabitant and France up to 3,900 lb.

Our coal, because of its quality, had a good reputation in foreign markets. However, because of competition from other coal-producing countries and other conditions (economic crisis, 1930-35), the amount of coal exported in 1926 was 15.9 million short tons (maximum during the period of the coal strike in England). In 1929 exports were 15.6 million tons; in 1934, 11.1 million; in 1935, 9.7 million; and in 1938, 12.9 million tons. The mines did not work for a number of days a week for lack of an outlet, and some mines were closed.

After the war the situation was reversed. Problems of production prevail, since the outlet is secure as a result of increasing industrialization and exports. In 1955 internal consumption in Poland amounted to approximately 7,600 lb per inhabitant, and after the war Poland exported up to 27.5 million short tons a year—19 million tons in 1956.

The amount of coal exported depends only on production capacity and on the internal requirements of the country, since an outlet is assured. It can be said that export of Polish coal represents a good example of the possibility of economic cooperation between countries having differing internal political systems.

Coal Age

The coal industry's tasks and opportunities are analyzed at meetings of

The National Coal Association and Coal Exporters 84

Nuclear energy, dust collection, AC power, and belt haulage dominate discussion at the

Central Appalachian Section, AIME 87

Key problems, accomplishments and opportunities are discussed by key men during

Spring Meetings—1957

Coal preparation at Christopher Coal and continuous mining are among topics of

The West Virginia Coal Mining Institute 89

A call for fire prevention effort and the cost and safety facts of roof bolting highlight the

47th Mine Inspectors Convention 92

The National Coal Association and the Coal Exporters Association of the United States, Inc., meet to discuss . . .

The Challenge of Coal's Future

Industry tasks and opportunities analyzed. Exporters urged to start shipbuilding program.

REELECTED NCA PRESIDENT—L. Newton Thomas, president, Carbon Fuel Co.

JOHN S. ROUTH, The Pittston Co.—New president, Coal Exporters Association of the United States, Inc.

THINKING AND ACTION vital to realizing the promise of coal's future dominated sessions of the 40th Anniversary Convention of the National Coal Association and the 12th Anniversary Convention of the Coal Exporters Association of the United States, Inc., held at the Shoreham Hotel, Washington, D. C., June 4-6, and June 5, respectively.

Featured speakers were: NCA president L. Newton Thomas, president, The Carbon Fuel Co.; NCA executive vice president, Tom Pickett, the Hon. Hatfield Chilson, under secretary, Department of the Interior; J. C. Potter, president, Rochester & Pittsburgh Coal Co.; John W. Spurdle, partner, Dominick & Dominick; William H. Gehring, purchasing agent, Basic Materials Div., E. I. du Pont de Nemours & Co.; and Clarence G. Morse, chairman, Federal Maritime Board. The program also included reports by NCA committees and by the Bituminous Coal Institute (p 88).

W. W. Goldsmith, convention chairman and president, The Elkhorn Coal Co., called the first general session to order for the invocation by Dr. Bernard Braskanys, chaplain, U. S. House of Representatives, and for opening remarks by James Hyslop, president, Hanna Coal Co., and presiding officer.

COAL'S CHALLENGE

In the first talk Wednesday morning, NCA president L. Newton Thomas called on bituminous to accept the tremendous responsibility of supplying increasing amounts of its product "at fair and reasonable prices to the consumer with a fair and reasonable profit to the industry."

Citing specific tasks that lie ahead, Mr. Thomas said:

Coal must fight for revision of Federal policies which will put it on an equal footing with competitive fuels. Among other things, this means a more realistic percentage depletion allowance and repeal of the 4c a ton transportation tax.

Coal must develop a price structure which will permit it to increase present productive capacity necessary to meet future demands. Among other things, this means (1) that marketing methods must be improved and (2) that industry employees, whether management or labor, will have to recognize that each successive improvement in production and lower costs cannot be wholly dedicated to employee benefits.

If coal is to compete adequately with

INDUSTRY MEETING—A Special COAL AGE Staff-Written Report

NCA Management

President—**L. Newton Thomas,** president, Carbon Fuel Co.

Vice Presidents—**H. Vernon Fritchman,** vice president, Rochester & Pittsburgh Coal Co.; **Harry LaViers,** president, South-East Coal Co.; **K. A. Spencer,** Pittsburg & Midway Coal Mining Co.; **Fred F. Kolbe,** president, The United Electric Coal Cos.

Executive Vice President—**Tom Pickett**

Treasurer—**John L. Kemmerer Jr.,** vice president, Wise Coal & Coke Co.

Secretary and Assistant Treasurer—**Carl C. Crowe**

Directors now include:

Joseph T. Berta, president, Pittston-Clinchfield Coal Sales Corp.

J. S. Besser, sales manager-fuel, The Colorado Fuel & Iron Corp.

C. R. Bourland, president, The New River Co.

D. W. Buchanan Jr., president, Old Ben Coal Corp.

L. C. Campbell, vice president, Eastern Gas & Fuel Associates.

S. Austin Caperton, president, Slab Fork Coal Co.

Newton H. DeBardeleben, president, DeBardeleben Coal Corp.

S. J. Dickenson, secretary-treasurer, Mary Helen Coal Corp.

C. C. Dickinson, president, Dickinson Fuel Co.

Mark Eastin Jr., president West Kentucky Coal Co.

George E. Enos, president, The Enos Coal Mining Co.

J. D. Francis, chairman of the board, Powellton Coal Co.

H. Vernon Fritchman, vice president, Rochester & Pittsburgh Coal Co.

Otto Gressens, chairman, finance committee, Peabody Coal Co.

Chas. R. Griffith, president, Southern Coal & Coke Co.

C. A. Hamill, president, Sycamore Coal Co.

H. R. Hawthorne, general counsel, Pocahontas Fuel Co.

R. L. Ireland, chairman, executive committee, Pittsburgh Consolidation Coal Co.

W. J. Johnson, president, The Roundup Mining Co.

Herbert E. Jones, president, Amherst Coal Co.

Norman E. Kelb, president, Ayrshire Collieries Corp.

L. Russell Kelce, president, Peabody Coal Co.

oil and gas, it must continue to make use of advanced engineering principles, technical skills and the rapid improvement in mechanization. In turn, this points up two important jobs ahead—greater stress on research and on the recruitment of technically trained men from high schools and colleges.

Other tasks include more intense promotion of safety education, reduced transportation costs and an adequate supply of cars and motive power. A stronger industry-wide effort should also be exerted to gain implementation of recommendations made in the Report of the Presidential Advisory Committee on Energy Supplies and Resources issued Feb. 26, 1955. Some of the coal industry's problems were very appropriately pointed up in this report but none has been effectively prosecuted.

INDUSTRY COOPERATION

Tom Pickett drew particular attention to the fact that coordination in the work of the industry's organizations is better than ever today. Mutual cooperation between NCA and its membership is also of a high order. And, he added, continuing diligence to promote the purposes of NCA (now defined in a new booklet, "The National") will be a major factor in efforts to meet the challenge of coal's future.

INDUSTRY RESEARCH

To realize the promise of its future and to supply the needs of the Nation's economic progress, one of coal's most important jobs is to add as much as possible to the fine program of technological and economic research which it has begun.

The coal industry must make more and more efficient the mining, preparation, transporting, and marketing of its product, Undersecretary Chilson, told the convention. The industry must try continually to find new uses for coal in substantial quantities. It must learn more about low-temperature carbonization, coal gasification, and the production from coal of synthetic liquid fuels. To all these activities research—fundamental and applied—is the key. Such research, which is more or less traditional, must be pursued with resolved drive.

But new types of research must also be undertaken. To the scientist coal is a fascinating mineral which, through processing, can be put to countless uses and turned into countless new products.

Many thousands of chemicals come from coal and coal gases—chemicals from which in turn come explosives, medicines, fertilizers, paints, plastics. Coal is also a source, though not yet an economic source, of gasoline. The more new methods that can be found for processing coal and its by-products, the more opportunities the industry will have for finding new markets—and the more opportunities for interesting prospective investors.

Many uninformed people today think of coal as a sick or dying industry. Over the past 20 yr it has had its ups

Exporters Look to the Future

EXPORT COAL MARKETS are very important to the health of coal producers, and the coal export business is in the "Big Leagues" today, not only in volume but also in dollar value. To guard this business, it is now time to gear thinking to big-league operations in the shipping of coal, as well as in its production.

Clarence G. Morse, chairman, Federal Maritime Board, thus keynoted the 12th Anniversary Convention of the Coal Exporters Association of the United States, Inc., in a luncheon address June 5.

In the carriage of bulk cargoes such as coal, greater size and speed of ships provide the best bet for licking the problem of higher American operating costs, Mr. Morse stated. This has been proven true in the carriage of petroleum products, and of other bulk cargoes. It is the one method of reaching the lowest transportation cost per ton of coal. The attempt must be made to provide efficient ships if a portion of the long-term coal carrying business is to be maintained under the American flag.

For the coal trade, American industrial ingenuity and technological ability can develop suitable ships and efficient loading and discharging facilities both here and abroad. In other fields, the interests of both labor and management have been served by using modern methods to overcome the difference in costs due to the higher U. S. standard of living. There have been numerous examples of the feasibility of such an approach to the problem, notably in the handling of bulk cargoes on the Great Lakes.

Equally important is the development, or rather the application of advanced business methods to fit the new equipment. The use of new big ships equipped with efficient loading mechanisms for the export coal trade should be accompanied by the kind of long-term charter agreements which allow for smoothing out and equalization of dollar risks. The pattern is well developed in the tanker trades and is no doubt developing in the ore and other bulk transport trades.

Mr. Morse warned that American shipping must advance beyond the present meager Liberty ship participation in the coal trade, or its days are numbered. Coal exporters must also look ahead and must protect their export markets. Competition is not exclusive. It can come in unexpected ways. It can come from being priced out of the foreign market because of the high level of coal charter rates. It can come from a greater realization of the potential now promised by other fuels, or from the newer world of nuclear fission.

By cooperating to develop a modernized system of ocean transport for coal, it will become more possible, in the long run, to secure markets, lower costs and maintain reasonable profits.

ASSOCIATION BUSINESS

Highlighting the business session following the luncheon, the exporters elected J. S. Routh, The Pittston Co., as president of the association and W. H. Naylor, Pocahontas Fuel Co., Inc., as vice president, succeeding, respectively, S. Pemberton Hutchinson, General Coal Co., and A. F. Kempe, Seneca Coal & Iron Co.

Four Class "B" directors were re-elected: W. H. Carpenter, Dexter-Carpenter Coal Co.; Mr. Kempe; J. R. Maust, Saljoan Coal & Coke Corp.; and George McCree, Maritime Coal & Coke Corp.

F. F. Estes, the association's executive-secretary, predicted an era of "reasonably stable export tonnage." U. S. exports of bituminous and anthracite in 1957 will equal, if not slightly exceed, the 50 million-plus tons shipped in 1956.

James W. Haley, treasurer and general counsel, reported that a uniform type of coal export contract was under study. Recommendations on the matter will be submitted to the membership as soon as possible.

M. F. Bergan, the Berwind-White Coal Mng. Co., speaking for W. P. Anderson, chairman, transportation committee, said that long strides had been made toward stabilizing shipping procedures and toward improving car scheduling, ship movements, etc. The railroads have contributed much in sharing the burden of shipping problems. All parts of the industry, however, must continue to work for further improvements in export shipping.

D. T. Buckley, chairman, government relations committee, said that the export business was now operating on a sound private enterprise system. Except for minor tonnages to Spain and Korea, foreign purchasers are buying American coal without economic aid from the U. S. Government.

NCA Committee Reports

Committee chairmen reported as follows:

Interstate and Foreign Commerce—Walter F. Schulten reviewed transportation developments of the last year, including freight rates, passenger deficits and legislation. In particular, he noted, some progress has been made toward repeal or reduction, in the immediate or near future, of the transportation tax. Coal industry policy previously established, which will be made known to congressional committees as related legislation is introduced, includes:

1. Opposing any change in the present rate suspension provisions of Sec. 15 (7) of the Interstate Commerce Act.
2. Opposing substantial change in the present rate-making rule, except for those contained in "Shall-Not Bills" H. R. 5523 and H. R. 5524, which would require the ICC not to consider the effect of just and reasonable rates on other modes of transportation.
3. Favoring the vesting of the ICC with authority to allow railroads to abandon passenger service, both interstate and intrastate, which places an undue burden on interstate commerce.
4. Favoring the payment, by all users of rail transportation, of charges that will meet out-of-pocket costs and make a reasonable contribution to overhead of the carriers.
5. Favoring the establishment of incentive, volume and multiple-car rates.
6. Favoring the retention of the present classifications of water carriers and the present applicable rules governing the filing of rates and charges.
7. Opposing any change in or repeal of the bulk commodity clause relating to water carriers (Sec. 303b, Interstate Commerce Act).

Coal Car Supply—Joseph T. Berta said that a solid and firm foundation has been laid toward the elimination of the crippling car shortages which faced the industry in 1955-56. The original goal in the production of new hopper cars at a minimum rate of 2,000 cars per month has been met. For the 5 mo ending May 1, 13,128 new hopper cars were delivered and installed by the railroads—an average of 2,625 cars per mo. As of May 1, there were still 35,417 new hopper cars on order.

Mr. Berta pointed to one important obstacle that must not be overlooked—the great number of over-age cars. On Jan. 1, 1956, the average age of all hopper cars owned (501,234) was 20.76 yr, or slightly above the customary 20-yr write-off age figured by the railroads. The bad part of this situation is that 137,221, 27.4% of the ownership, are over 30 yr old.

Atomic Energy—Ralph Knode, reporting for Kenneth A. Spencer, reviewed existing industry policy on atomic energy. While committed to the support of atomic research and the development of nuclear power for national defense, belief is still firm that nuclear electric power must be judged entirely on its ability to generate electric energy at a lower cost, including all charges, than conventional thermal plants.

Research—Harry LaViers advised that substantial progress has been made toward congressional action which will set up an independent agency in the federal government to be known as the "Coal Research Foundation," financed with federal funds. The House Interior Committee has favorably recommended the proposal but it must still go before Congress. Industry-wide wholehearted support was called for in this effort.

Vocational Training and Education—Aside from continued cooperation with the colleges, Roland Luther, speaking for Henry C. Woods, said that coal must give a great deal more attention to high schools. Students in the first 2 yr of high school must be made aware of the opportunities in the industry. They can then study the courses that will best prepare them for entrance to college or for training in the coal mining profession. Everyone interested in coal mining, preparation or utilization can help in this important field of education.

Taxes—Critical review and study has been given to the proposed regulations issued by the Treasury Dept. under the natural resource provisions of the Internal Revenue Code of 1954, James F. Bissett reported. A number of recommendations for changes have been made. Final regulations will not be issued until some time this fall.

Hopes are high that the meaning of the term "the property" for depletion purposes will be corrected to eliminate unintended hardships.

Proposals to repeal the tax on the transportation of property have not yet been acted upon by the Ways and Means Committee.

The need for repealing the transportation tax is widely recognized but Congress is reluctant to adopt any tax revision which will reduce revenue. For the same reason, serious consideration has been delayed on the coal industry's need for a more adequate and equitable percentage depletion allowance.

Coal Economics and Statistics—Distribution statistics will soon be made available, perhaps by the end of the year, by the USBM, George E. Enos stated. Also, he advised, a mine supplies cost index for use in escalation contracts is being developed. It is hoped that the finished index will be ready for submission to the entire industry early in September, if not before then.

Land and Water Use—R. L. Ireland presented L. E. Sawyer's report which among other things cited the need for additional funds to support the acid mine water research of Dr. S. A. Braley, Mellon Institute.

Safety—S. Austin Caperton said that there were no single, special problems to lay before the convention. The question of safety and accident prevention is one demanding ever-increasing effort and the NCA Dept. of Safety proposes to continue its cooperative activities to the fullest extent possible.

Public Relations—Recommendations and suggestions have been made to the board of directors for expanding the public-relations program. This program is dedicated to cultivating a favorable attitude toward coal through informing the public about:

1. **Coal's importance to the Nation** as a source of fuel, power, light and chemicals.
2. **Miners,** their wages, working and living conditions.
3. **The progressiveness and efficiency of the industry** and the forward-looking philosophy of its management.
4. **The advantages of coal** when used with modern equipment.

Resolutions—Harry LaViers proposed and the convention adopted nine resolutions. Included were resolutions aimed at improving car supply, obtaining Federal regulation of natural gas and imports of oil, furthering an appropriate program for coal research, and repealing the transportation tax on the shipment of coal.

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and downs, and it has had powerful searchlights turned on its labor-management problems. But the time has now come to correct any misconceptions that exist and to try to focus attention on the industry's future.

Mr. Chilson advised that the Interior Department has carefully considered the request calling for the USBM to collect and disseminate factual data on the distribution of bituminous coal. This work will be resumed as funds become available for it. The department will continue its investigations into our country's mineral reserves and into the mining, preparation, treatment and use of mineral fuels. It will continue to concern itself with resource conservation, health and safety conditions, efficiency, and economic development within the mineral industries. It will continue to cooperate with the industry in disseminating information, and in stimulating research.

INDUSTRY EXPORTS

A discussion of "Coal Exports and Our Merchant Marine" by Clarence G. Morse, highlighted the Wednesday luncheon and afternoon convention sessions of the Coal Exporters Association of the United States, Inc. (p 85).

STABILIZING THE INDUSTRY

If coal is to remain the backbone

(*Continued on p 88*)

NUCLEAR POWER, fossil fuels—Dean E. F. Osborn, College of Mineral Industries, Penn State University.

DUST COLLECTION, AC POWER, BELT HAULAGE—W. G. Talman (left), chairman; A. L. Barrett, Joy Mfg. Co.; C. S. Conrad, Consolidation Coal Co. (W. Va.); R. R. Godard, U. S. Steel; and M. H. Shudate, Truax-Traer.

Nuclear energy, dust collection, AC power and belt haulage feature spring meeting of . . .

Central Appalachian Section, AIME

NUCLEAR ENERGY DEVELOPMENTS, new equipment for dust collection, AC power, and belt haulage were major coal topics at the spring meeting of the Central Appalachian Section, American Institute of Mining, Metallurgical & Petroleum Engineers, Pulaski, Va, May 24-25. Congressman W. Pat Jennings, 9th Virginia, was the speaker at the dinner session, with R. H. Hughes, president, Clinchfield Coal Corp., as toastmaster.

NUCLEAR ENERGY

"The conclusion is inescapable that world energy requirements will double every 10 to 20 yr for some time if the energy can be produced," observed E. F. Osborn, dean, College of Mineral Industries, Pennsylvania State University, at a session at which D. C. Ridenour, chief engineer, Olga Coal Co., Coalwood, W. Va., was co-chairman. Dean Osborn was specially introduced by James Gray, vice president, operations—coal, U. S. Steel Corp.

A major question is how the fossil fuels can keep up with the demand, with a further question marking the role of nuclear energy—"when and how fast we can bring this into the picture, remembering that in order to get nuclear energy we need to consume energy from the fossil fuels." Possibly 20 yr from now about 10% of our energy requirements will be met by nuclear energy, provided the problems can be worked out.

"For the next 25 to 30 yr, which is as far ahead as we ought to try to make energy predictions," Dean Osborn concluded, "we must produce in this country fossil fuels at an ever-increasing rate. This will be the critical period for the coal and oil industries, and certainly for the coal industry will be unlike anything it has experienced in the past. Research in all fields of exploration, production and engineering must be greatly stepped up."

INDUSTRY MEETING—
A Special COAL AGE
Staff-Written Report

DUST COLLECTION

Dust collection with the Microdyne, by A. Lee Barrett, director of research and development, Joy Mfg. Co., was the opening subject at the coal technical session presided over by Woods G. Talman, general superintendent, Gary Dist., Coal Div., U. S. Steel Corp., with John L. Schroder, chief engineer, as co-chairman. Coupling aerodynamics with particle separation in a cylindrical unit, the Microdyne uses an impingement screen kept wet by a water spray; curving vanes to spiral the air-water stream and throw the water carrying the particles into chambers at the side;

straightening vanes; and a fan for power. It is about one-tenth to one-twentieth the size of competitive units, Mr Barrett noted, and its efficiency is higher by a wide margin.

Examples of performance offered by Mr. Barrett included 94.4 to 98.8% efficiency by weight in removing dust from flash-dryer discharge carrying 1 to 2 or more grains per cubic foot, and 97.6% average with dust from crushing averaging 1.4 microns in size. Dust loading in this instance was 5 to 13 grains per cubic foot, and the Microdyne, with a double impingement section, followed high-efficiency cyclones.

AC POWER

A major reason for experimentation with AC for conventional mining equipment at mines of the Pittsburgh Consolidation Coal Co. was combatting the hazard of mine fires, observed Chester S. Conrad, division maintenance superintendent, Consolidation Coal Co, (W. Va.), Fairmont, W. Va., in describing the system put into operation at Williams mine Nov. 6, 1956. It was made possible by the torque-converter shuttle car.

Section equipment comprises a cutting machine, loading machine, roof-control unit, hydraulic car spotter, portable rock duster and two shuttle cars, all powered by 440-v squirrel-cage motors. The AC system features a grounded neutral with current-limiting resistors in both the high- and low-voltage circuits. All circuit breakers are equipped with ground-trip devices, and tripping in the low-voltage circuit is selective.

Production experience has been satisfactory, Mr. Conrad noted. "The AC-equipped section showed the lowest cost per ton compared to all other sections in the mine, no doubt because maintenance costs were 20% of the average for all other sections." Costs were mainly for cable repair and replacement, and roughly 75% of the lost time could be charged to cables, including mandatory checking of ground-wire continuity twice a shift to insure that it is functioning.

"In summary it can be said that with the trend toward the use of AC power in underground coal mining there may be an excellent opportunity to pave the way for legalizing the use of diesel power for track haulage. The use of AC for section equipment will permit the installation of the best in safety devices and prove to everyone that electric power can be safely used in deep mining. This step, wisely taken, will give increased stature to management's insistence that diesel units equipped with gas scrubbers, are also just as safe in undergound operation."

AC SHUTTLE CARS

Reporting on a test of prototype Joy 10SC 440-V AC shuttle cars at Palmer mine Dec. 13, 1956-April 9, 1957, Robert R. Godard, electrical engineer, Frick Dist., Coal Div., U. S. Steel Corp., Uniontown, Pa., said conditions ranged from good to atrocious, but there was no instance of stalling as a result of inadequate torque output.

Total working time was 314 car shifts. Delays accounted for 2.19% of available operating time. Cable accounted for 62.39% of this delay time; total electrical for 84.75; and total mechanical for 15.25. Operation disclosed a major need for a permanent cable fault locating device at the section power distribution center.

"Evaluation of the data taken during the testing of these cars," Mr. Godard concluded, "leads to the conclusion that the AC-operated direct-drive shuttle car is superior to its DC predecessor and succeeds in closing the gap in AC-operated face equipment.

BELT HAULAGE

Using experience with various types of conveyors over a 20-yr period, M. H. Shumate, assistant general manager, Truax-Traer Coal Co., Kayford, W. Va., highlighted the benefits of modern units and specifically those of the rope belt. The major advantage is the drastic reduction in man-hours required for installation. In 1941, as an example, it cost 20c per foot to extend an old-design truss-type conveyor in 240-ft stages. Today, the labor cost is 55½c per foot. In comparison, the cost of extending the rope-belt conveyor is 11c per foot.

To date, Mr. Shumate concluded, experience with the rope-type belt conveyor shows definite advantages at Truax-Traer. "We have improved move-up and supply costs, and have achieved better training and consequently better belt life, greater load-carrying capacity, and ability to provide numerous loading points cheaply without incurring poor training, spillage or undue belt wear."

Coal's Challenge (*from p 86*)

of the Nation's fuel economy and be able to meet shortages of oil and gas in times of emergency, the industry must have an average annual market of at least 500 million tons, C. J. Potter, Rochester & Pittsburgh Coal Co., declared at the Thursday morning general session. Session chairman was DeWitt C. Snyder, C. H. Sprague & Son. He was introduced by convention chairman, Frank A. Burke, The Lorain Coal & Dock Co.

Dr. Potter pointed to certain problems that must be solved to stabilize the market at 500 million.

"We must evolve constructive policies and endeavor to have those policies implemented by appropriate government action, and, if need be, with legislation," he said.

The coal industry could best help itself, Dr. Potter continued, by greater mechanization, increased cost-cutting, competitive pricing, and lower transportation costs. In particular, he cited the need for greater mechanization progress in working thinner seams (under 50 in), and for developing alternatives to high-priced transportation, such as the location of more generating plants at or near coal mines, the development of new waterways, and pipeline movement of coal.

FINANCING GROWTH

The eligibility of coal companies for financial aid depends on the soundness of their management, the size of their operation, their reserves, their financial record and capital structure, and their forward thinking, according to John W. Spurdle, Dominick & Dominick. His talk is published in full on p 50 of this issue.

INDUSTRY MARKETS

Highlighting the luncheon session Thursday, William H. Gehring, E. I. du Pont de Nemours, Inc., congratulated the coal industry on the fine job it has done in increasing production when required and on the general improvement in quality. Mr. Thomas, and Gene Tunney, The Pittston Co., acted as presiding officer and toastmaster, respectively.

Although a remarkable job has been done under very trying conditions, Mr. Gehring told the convention that much can still be done to increase the use of coal, to lower delivery costs and time, and to improve productivity.

Mr. Gehring also described a promising future for coal in electric utility plants. Residual fuel oil, he said, is becoming more valuable as a source of gasoline than as fuel for power generation, and "from present indications, gas will gradually price itself out as a fuel for power boiler use."

BCI PROGRESS

In the Thursday afternoon session, staff representatives of Bituminous Coal Institute gave a progress report on BCI activities. Participating were: R. L. Ireland, president; M. L. Patton, executive vice president; Carroll F. Hardy, managing director; F. A. Burke, chairman, Ohio District; C. R. Mably Jr., chairman, Michigan District; and O. L. Scales, chairman, Indiana-Kentucky District.

The entire group spoke enthusiastically on the results so far in organizing and carrying out the BCI program. In its first 6 mo of operation—Oct. 1, 1956 to Mar. 30, 1957—the institute has gained 2,300,000 tons of coal for the industry.

While organization is moving satisfactorily toward a highly integrated effort, the entire industry was strongly urged to back up the BCI effort.

Within the next year, it was also stated, BCI will set up 20 pilot plant units of BCR's newly-developed package boiler in various parts of the country. After adequate periods of testing under supervision of BCI engineers, it is expected that the new unit will be made available for commercial sale.

West Virginia Institute Meets

Preparation, augering and continuous mining, AC power, underground haulage and personnel testing viewed at Fairmont session.

HAULAGE, PERSONNEL TESTING—Harold Durette (left), Hanna Coal Co.; J. F. Core, United States Steel Corp., session chairman; and W. N. Poundstone, Christopher Coal Co.

MAJOR TOPICS at the Spring meeting of the West Virginia Coal Mining Institute, Fairmont, W. Va., June 14 and 15, were preparation, augering and continuous mining, AC power, underground haulage and personnel testing. George McCaa, general manager, Ireland mine, Hanna Coal Co., Moundsville, W. Va., presided at the Friday luncheon. Don B. Potter, president, Monongahela Power Co., Fairmont, W. Va. was guest speaker. C. R. Nailler, president, Christopher Coal Co., Osage, W. Va., was toastmaster at the dinner. Guest speaker was Hon. Max DeBerry, circuit judge, 3rd judicial circuit, Harrisville, W. Va.

Speakers and their subjects at the opening session were: F. R. Zachar, consulting engineer, Christopher Coal Co., Osage, W. Va., on the coal preparation plant at Humphrey mine, and C. E. Compton, president, Grafton Coal Co., on new developments in auger mining (paper presented by Q. G. Bullock, Compton, Inc.). W. J. Skewes, chief engineer, Pocahontas Fuel Corp., Pocahontas, Va., and Crawford Wilson, chief, West Virginia Department of Mines, Charleston, W. Va. were co-chairmen.

HUMPHREY PREPARATION

In describing the new preparation plant at the Humphrey mine of the Christopher Coal Co., Mr. Zachar stated that the plant has been in operation since mid-March and that complete operating data are not yet available. The plant has produced approximately ¾ million tons thus far. To date, 1,300 to 1,500 tph of clean coal have been handled for short periods without trouble. Daily capacity will be about 20,000 tpd. The plant serves two mines; Pursglove No. 15 and Humphrey No. 7. Coal from No. 15 is brought to the plant by a belt conveyor 2 mi long and from the No. 7 by a mine car system. Coal from both mines is reduced to 5 in and fed by a 42-in belt to a 5,000-ton blending bin. Blending helps to produce a good quality of washed coal. Coal is washed at 5x0 with approximately 50% being ⅜x0.

The plant is located on a hillside and is 132 ft high with a total floor area of 110,000 sq ft.

Total connected horsepower is 4,200 with 3,150 and 1,150 hp using 440 and 2,300 V respectively. Primary voltage to the plant is 2,300. This voltage is distributed to five load centers, four of which transform the voltage to 440 and the fifth to 2,300 for high-voltage motors. Mr. Zachar stated, the only innovation in the plant is the Hyslop screen which filters mechanically on shakers. The screen is 10 by 40 ft., driven by a 20-hp motor and supported by ropes.

The entire plant is controlled by one man who operates a pushbutton control panel. Control wiring consist of multiconductor cables laid in expanded raceways to permit easy troubleshooting.

The river tipple can load four barges at a time without moving them. It is operated by two men. A third man is used to continuously sample coal. The two men will be able to handle from 7,000 to 8,000 tons per shift.

Rail loading facilities are being installed at the plant and when completed will permit loading in railroad cars when necessary.

INDUSTRY MEETING—
A Special COAL AGE
Staff-Written Report

AUGER MINING

Establishment of the coal auger as an integral part of the mining equipment enabling a coal property to be completely developed and mined has been the goal of Compton, Inc., said Mr. Compton.

Improvement and development directions, along with solutions and advanages are as follows:

1. Self-contained power package. This was accomplished by diesel engines and hydraulic drives which made the auger an independent unit with maximum operating characteristics.

2. Reduced size of auger. Auger section racks were installed over the main frame which shortened the sections and permitted the use of more sections. These principles increased the drilling depth from 150 to 208 ft and the auger sections were shortened from 50 to 26 ft.

3. Easier moving. Moving the modern auger is a simple operation. It can be assembled and disassembled in 1 to 1½ days and can be moved over the highway to any job site.

Although hourly output has not been improved, the machine will mine a better product by drilling a more perfect hole. This was accomplished by a patented head which employs bearing skid supports to follow the head into the hole and prevent any deflection.

Further improvement was made by opening up the auger section. This was accomplished by removing the bearings and supports. The size of coal was improved to the extent that, in certain cases was better than strip or deep mining.

Success of the auger can best be pointed up by the fact that more augers are employed on deep-mined properties today than as follow-ups to stripping operations.

Mr. Compton stated that a successful deep mine machine should be one that would (1) produce coal with size consistency, (2) work more continuously at the face and (3) have built-in roof-bolting or timbering equipment. The machine should also be designed so that unit assembly could be effected to speed up maintenance repairs and breakdowns.

The first underground auger miner (see New Products Section of this issue) is a low-vein unit 27½ in high, 8 ft 6 in wide and 24 ft long. It employs two drum-type cutting heads which together cut in a 180 deg arc. The miner is powered by two 50 hp DC motors. It can be furnished also with AC motors. These two motors drive the hydraulic system and all drives and actions are hydraulically actuated. Equipment includes two built-in special hydraulic roof-bolting and timbering machines which operate approximately 7 ft 6 in from the face.

Speakers and their subjects at the afternoon meeting were: J. H. Sherrard Jr., chief engineer, Johnstown Coal and Coke Co., Johnstown Pa., on continuous mining with the Colmol; and Chester Conrad, maintenance superintendent, Consolidation Coal Co. (W. Va.), Monongah, W. Va., on use of AC power on a conventional mining section. Chairman of the session was William Laird, superintendent, Federal No. 1 mine, Eastern Gas & Fuel Associates, Grant Town, W. Va.

CONTINUOUS MINING

After a description of the lower Freeport and Sewell seams Mr. Sherrard noted that the company's mines employ Jeffrey 76-A and 76-AM Colmols followed by Joy 12 BU loaders. Piggyback conveyors dump on Long crawler-mounted heads. Transportation to the preparation plant is by belt conveyor and mine cars. Both Fletcher hydraulic drills and Cleveland stopers are used to bolt top. A film was shown to describe the bolting cycle using a Colmol and a Fletcher drill.

He offered a series of plans and controls to improve the maintenance service as follows:

1. **Training.**
2. **Breakdown repairs.**
3. **Initial preventive maintenance.**
4. **Complete preventive maintenance.**
5. **Supply maintenance.**

PREPARATION, AUGERING—F. R. Zachar (left), Christopher Coal Co.; Q. G. Bullock, Compton Inc.; and W. J. Skewes, Pocahontas Fuel Corp., session chairman.

Two properties are operated at 275-v DC and the third at 440-v AC. All new auxiliary equipment is designed for the easiest conversion from one to the other.

DC power is supplied by 300-kw rectifiers and transmitted by at least 1,000-MCM conductor in positive and negative. Maximum distance from source is limited to 3,500 ft. AC power supply is developed from 2,400 V on the surface, transformed to 480 V by 100-kva surface-mounted transformers and transmitted by 500-MCM conductor. Booster transformers (15-kva) in self-contained units are inserted in the system at the Colmol nips to increase the voltage by 10% and overcome the increased line loss. The minimum voltage permitted at the point of entry at the Colmol is 445 V.

Development places are driven with three adjacent 24-ft runs from right to left, having a straight face upon completion of the third run. The bolter is always in the last complete run driven and keeping pace with the Colmol so that the maximum unbolted roof is 9.75 ft wide and 26 ft long. The portion of that area not occupied by the bolter is secured by roof jacks and/or safety posts. At the end of the third run 18, 24 or 30 ft of panline is added.

Pillar extraction with Colmols has been limited in extent by the need of rapid development. What pillaring has been done has proved highly successful. Rooms are driven on 60-ft centers with crosscuts on 80-ft intervals and 60 deg. At least one room is kept open ahead of extraction to provide a second means of egress. Pillars are taken only from one side of each room to decrease the amount of open gob. This is necessitated by fast-acting roof in the Sewell seam and by the subjacent mining in the Lower Freeport seam.

Mr. Sherrard stated that the average tonnage in the Sewell has been 374.7 tons per six-man face crew and in two distinct areas of the Lower Freeport has been 304 tons and 216 tons per six-man face crew.

AC POWER

The use of AC power on a conventional mining section shows that cost is 20% less than on a DC section, said Mr. Conrad.

A conventional mining section consists of the following equipment:

1. **Cutting machine.**
2. **Loading machine.**
3. **Roof control unit.**
4. **Hydraulic-type car spotter.**
5. **Portable rockduster.**
6. **Two shuttle cars.**

All equipment is equipped with squirrel-cage motors. Type SHD cable is used to transmit voltage in the mine. The cable is suspended on insulators and has a coupler every 1,000 ft.

The power distribution system includes: (1) grounded neutral with current-limiting resistors in both high-voltage and low-voltage circuits and (2) circuit breakers equipped with ground-trip devices. In the low-voltage circuit ground tripping is selective.

Power systems having "wye" connected secondary with the grounding conductor connected directly to the transformer neutral are considered dangerous. A phase-to-ground fault in this type of grounding system results in a high fault current and a correspondingly high voltage drop over the ground wire.

CONTINUOUS MINING, AC POWER—J. H. Sherrard Jr. (left), Johnstown Coal & Coke Co.; William Laird, Eastern Gas and Fuel Associates, session chairman; Chester Conrad, Consolidation Coal Co. (W. Va.)

Grounding with "wye" connected secondary with a current-limiting resistor in the grounded neutral at the transformer offers the best protection to personnel. On a 3-phase 440-v secondary connected with a 25-ohm neutral resistor the current is limited to about 10 amp and the voltage drop is 10 V. The value of the current is adequate for operation of a circuit-breaker trip device and the shock hazard has been practically eliminated.

Electrical components of the power distribution system include the following:

1. Surface power transformers.
2. Current limiting resistors in the neutral of the secondary winding.
3. Ground-current transformers.
4. Control transformers.
5. Oil circuit breakers with ground relay.
6. Overcurrent relays.
7. Undervoltage devices.
8. Ground checking devices which continuously monitor the ground wires in the high voltage cables to the power center.

The power center is a 300-kva unit substation, 4,160/7,200 to 480-v. Transformers are connected delta-delta. The power center consists of grounding transformers, circuit breaker and ground-current limiting resistor. A 5-kva transformer is provided at the center for local lighting and the use of small tools.

The load center is equipped with circuit breakers, and two low-voltage cables, type G, extended to a low voltage distribution center. Six circuit breakers are provided, each having separate breakers with ground trip, overload and undervoltage protection.

A new-type cable is being used so that all faults will be ground faults rather than phase-to-phase faults.

In concluding Mr. Conrad stated that the use of AC power on face equipment offers the safest in equipment and may at some future date include the use of diesel locomotives for track haulage.

Speakers and their subjects at the Saturday morning session were W. N. Poundstone, superintendent, Humphrey mine, Christopher Coal Co., Osage, W. Va., on analysis and selection of an underground haulage system and Harold Durette, personnel manager, Ireland mine, Hanna Coal Co., Moundsville, W. Va., on developments in personnel testing for the mining industry in West Virginia. Chairman at the morning session was J. F. Core, general superintendent, United States Steel Corp., Uniontown, Pa.

UNDERGROUND HAULAGE

Underground haulage equipment must be selected to give maximum efficiency and low cost. Underground equipment at the Humphrey mine includes shuttle-cars, rope belts and mine cars, said Mr. Poundstone.

Shuttle cars were selected because they offered more flexibility and continuous miners could not mine any more coal than the shuttle cars could haul. It was realized that they would produce more ton per shift than conveyors would produce even though tons per minute was higher with the conveyor.

Efforts to increase the number of trips made by the shuttle car resulted in limiting the haulage distance to 300 ft, and to an average on rough haulways of 275 ft. The discharge time of the conveyor was decreased from 1 min to ½ min. One shuttle car operating behind a continuous miner can haul 760 tons per shift, though in some cases where haulways are bad the output drops to 500.

Rope belts were selected to transport coal from the shuttle car because:

1. Three approaches are available for shuttle cars to discharge the coal.
2. Less labor is required to advance belt as compared to track haulage.
3. Car-moving equipment is only moved every 2,000 ft at the discharge point of the belt.
4. Belt lends itself to an automatic loading section.
5. There is no back-lashing of cables since the belt is kept close to the face.
6. Development work allows more time to lay a good track because work is not rushed and does not stop production.
7. Belts could be easily and quickly extended.

To further reduce cost Mr. Poundstone stated that belt idlers are placed on 10-ft center, thus reducing the number of idlers. Return idlers are spaced every 32 ft on support stands. Two spools of rope located and connected at the tail piece are unspooled as the belt is extended thus reducing the number of short pieces in the spans.

Mine cars were selected as the final stage of the mine haulage system which involved 12 mi of track. This decision was made because track would have to be installed to transport men, supplies and equipment. It would be impractical to maintain two systems, Mr. Poundstone said.

PERSONNEL TESTING

Personnel testing was first introduced in the mining industry by the Island Creek Coal Co., in 1946. Due to increased wage demands and more complicated equipment it was felt that necessary steps must be taken to evaluate the abilities of men being hired, said Mr. Durette.

Before any type of testing can be put in effect two things must be done: (1) determine job requirements and (2) determine the demands placed on the employee doing the work. Many tests have been used to evaluate personnel and many more will be tried to arrive at a suitable standard for selecting them. To date, no test has undergone sufficient study to assure adequate selection.

Future development in personnel testing should include:

1. Develop testing in new areas, such as the hand manipulation machine (demonstrated by the speaker) and used by the air force.
2. Use achievement and oral test to measure the experience of the applicant.
3. Continue study of effectiveness of test in use.

In concluding Mr. Durette cautioned that psychological testing programs for selection of personnel should be approched carefully until some means are made available to determine their effectiveness.

MIIA OFFICERS—C. A. McDowell (left); W. J. Schuster; H. J. Dusz, president-elect; J. J. Forbes, retiring president; Arthur Bradbury; G. J. Steinheiser; F. T. Powers, R. D. Bradford, and Joseph Bierer. B. H. Schull, vice president-elect, and C. A. Purcell, new editor-in-chief were not present for the photo.

Safety Progress, Safety Problems

Highlights of 47th Mine Inspectors' Convention:

- **Auxiliary fans and tubing aid continuous mining**
- **Roof bolting increases safety, cuts costs**
- **Mine fires call for all-out prevention effort**

CAUSE AND PREVENTION of mine fires and explosions, safety progress in the development of fire-resistant hydraulic fluids and in roof bolting, haulage, training and dust suppression were major themes at the 47th annual convention of the Mine Inspectors' Institute of America at Huntington, W. Va., June 10-12. Over 370 members and guests attended the annual meeting.

In the institute business sessions, members approved a resolution suggesting that legislatures in mining states restudy the subject of mine inspectors' salaries, and accepted an invitation from Denver, Colo., to hold the 48th annual convention in that city in 1958. Officers for 1957-58 were elected as follows:

President—Harry J. Dusz, director of mine safety, Ohio Div. of Mines, Columbus.

First Vice President—Ben H. Schull, director, Dept. of Mines and Minerals, Springfield, Ill.

Second Vice President—Arthur Bradbury, assistant manager of mines, Inland Steel Co.

Third Vice President—G. J. Steinheiser, mine inspector, Dept. of Mines and Mineral Industries, Uniontown, Pa.

Secretary—Joseph Bierer, Mt. Storm, W. Va.

Assistant Secretary—R. D. Bradford, supervisor, USBM, McAlester, Okla.

Treasurer—Frank T. Powers, director, Md. Bureau of Mines, Frostburg, Md.

Editor-in-chief—C. A. Purcell, chief, Dept. of Mines, Terre Haute, Ind.

Publicity Editor—W. J. Schuster, St. Clairsville, Ohio.

Studies of the causes and prevention of recent mine fires and explosions occupied center stage at the opening technical session on Monday.

Alaska Disaster

On January 18, 1957, five men were killed at the Evan Jones mine, Evan Jones Coal Co., Jonesville, Alaska, by an explosion of methane. In listing the evidence turned up by investigators, Phil R. Holdsworth, commissioner of mines, Dept. of Mines, Juneau, summarized as follows:

Blasting in the pitching coal (40 deg) was done with permissible explosives using regular delay detonators. Instantaneous or regular delay blasting could ignite methane if any of the shots were unburdened, and regular delay blasting could raise coal dust clouds and ignite these if any shot after the first was unburdened.

There was an obvious lack of ventilation in blind openings that deadended against a major fault. A drop of 0.24 in in barometric pressure occurred in the 8 hr prior to the explosion. This may have liberated methane along the fault line. However, the fan had not been operated continuously and this was definitely a factor.

It is unlikely that a test for gas was made prior to blasting. (Two of the victims were in position to blast in a pillared area.) The only safety lamp was hanging some distance away in another opening.

The adequacy of rock dusting is questioned and coal-dust accumulations were noted. Only air-driven equipment was used underground, ruling out the possibility of electrical ignition.

Important recommendations for preventing similar disasters were presented by Mr. Holdsworth, as follows:

The use of regular delay detonators should be discontinued, and tests for gas should be made immediately before and after shooting.

A system of bleeder entries to assure positive ventilation through and around

SAFETY PROGRESS—Clyde Gibson (left), Hanna Coal Co.; Nathaniel Kirk, Snow Hill Coal Corp.; J. J. Forbes, session chairman; Charles Ferguson, United Mine Workers of America; R. L. Vines, Kentucky Dept. of Mines & Minerals, and George H. Sambrook, United States Steel Corp.

caved areas should be provided, and well-constructed line brattices should be employed to direct the ventilating current to all faces.

Coal dust and loose coal should be removed before the accumulations become dangerous in quantity. Prior approval for the use of auxiliary fans should be secured before using such fans underground.

Anthracite Fires

Four workmen were killed in a gas explosion at Askam shaft, Truesdale Colliery, Glen Alden Corp., Nov. 7, 1956. As described by John D. Edwards, mine inspector, Pa. Dept of Mines and Mineral Industries, Wyoming, Pa., the mine had been idle since 1953, and the men were making some changes in order to concentrate pumping facilities at the shaft. Preliminary work included the construction of a false bottom to protect workmen from falling in the shaft. Steel members were used in construction and acetylene burning equipment was taken into the shaft.

Findings indicate that holes were being burned in one of the steel columns when molten metal dropped through small openings in the false bottom and ignited an explosive mixture below the false bottom.

In recommending ways to prevent this, Mr. Edwards pointed out that false bottoms should be constructed in a manner that will permit positive ventilation and should be so arranged that regular examinations can be made of the entire area. Furthermore, acetylene burning equipment should be used under the control of the district mine inspector.

Mr. Edwards then described a fire at Wanamie Colliery, Glen Alden, in which investigators hold the opinion that falling material caused a short circuit between a trolley wire and feeder cable in a 275-v DC system. 100 men in the mine at the time the fire was discovered moved to the surface without injury. Among the materials in a trip of cars near the fire area were 41 boxes of explosives. These were removed and the fire was fought directly with soda ash and water for four days. It was then decided to seal the area which involves about 350 acres of the Top and Bottom Baltimore seams, each 8 ft in thickness. Much of the area had been previously mined.

Methane Ignition

On Feb. 19, 1957, four men were burned at Bird No. 3 mine, Bird Coal Co., Riverside, Pa. One of the men, a shuttle-car operator, reported that he pulled his car under the discharge of a Colmol, where upon the operator started the mining machine. As retold at the institute by M. W. Thomas, mine inspector, Pa. Dept. of Mines, Windber, Pa., who investigated, the shuttle-car operator then saw flames rolling back toward him from the face. He rolled off the car and covered his face with his arms, then followed the car cable out to the belt conveyor. The other members of the crew were brought out. It is assumed, Mr. Thomas said that the methane accumulation was at the lower explosive limit. There were no indications of force and the flame area was confined to approximately the area surrounding the Colmol. Check curtains were not disturbed. It was noted that an excessive number of temporary splices had been made in trailing cables.

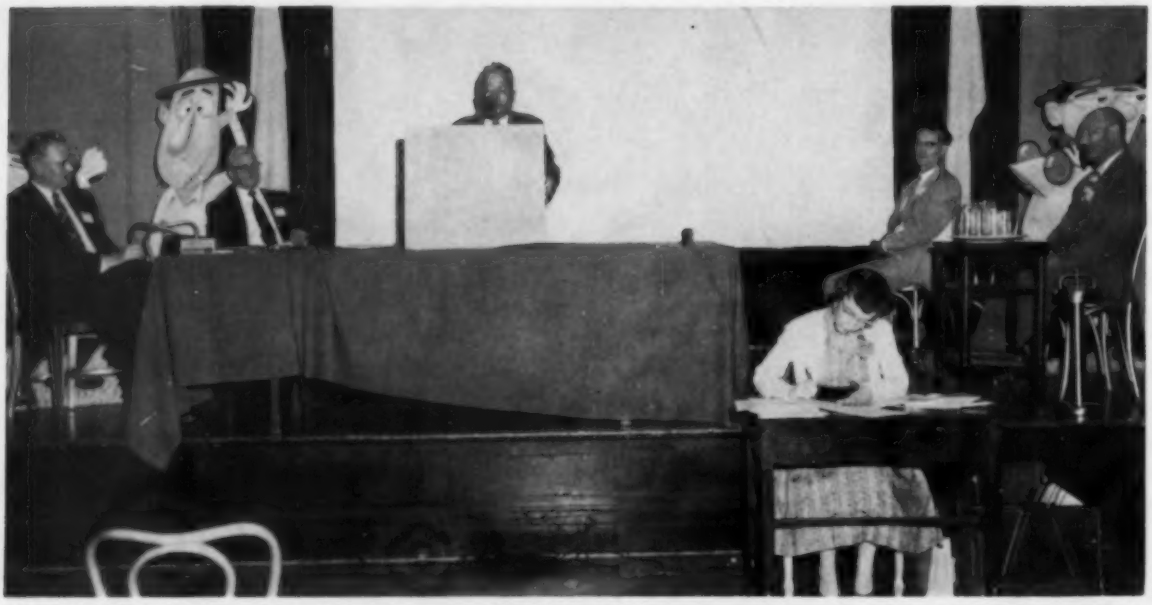
Expressing gratification that none of the men were fatally burned, Mr. Thomas stressed the importance of proper discipline in the matter of removing from service any portable cables having more than five temporary splices.

There was a sufficient volume of air in the split, but it could have been better directed in the immediate face areas. It is established, beyond reasonable doubt, Mr. Thomas said, that an electric arc between the shuttle car and Colmol, neither of which were frame-grounded, ignited the mixture.

In formal discussion of these three papers, James Westfield, assistant director, Health and Safety, USBM, Washington, D.C., reported that in the 16 mo ending April 30, 1957, 50 ignitions in the nation's coal mines had been reported to the Bureau. Of these, 22 gas or dust ignitions and 45 fires originated in electrical arcs or sparks; 12 ignitions and three fires were caused by open flames; and seven fires were caused by spontaneous combustion.

The rapid rate of advance must be accompanied by better cleanup of loose coal and dust in face areas Mr. Westfield said. Maintaining adequate rock-dusting is difficult with dry dust during mechanical mining operations. The use of wet rockdust near the face, with later dry dusting, seems to be most promising. Separate splits of air should be provided for each mechanical section and checks

INDUSTRY MEETING—
A Special COAL AGE Staff-Written Report



DUST CONTROL—J. E. Elkin (left), Duquesne Light Co.; Arthur Bradbury, session chairman; Murrell Reak, Illinois Dept. of Mines; T. L. Garwood, Chicago, Wilmington & Franklin Coal Co., and George A. Brecker, Reading Anthracite Co.

and line curtains should be properly maintained.

Safer Hydraulic Fluid

Intensive research is now being conducted toward the development of fire-resistant hydraulic fluids, reported S. P. Polack, health and safety engineer, USBM, Pittsburgh, Pa. It is hoped that such products soon will be ready for field testing in the mines, Mr. Polack said in his progress report on the research efforts.

It is anticipated that users and producers will carefully study each of the new fluids offered. It has been noted, Mr. Polack said, that a number of users disregard the specifications recommended by equipment manufacturers in favor of cheaper fluids, possibly because of the high losses resulting from leakage. It is hoped the new fluids will be as good if not better than these cheaper fluids, thus leading to their widespread acceptance.

Progress in safety was the theme of the Wednesday morning session. Members of the safety-progress panel were: Nathaniel Kirk, superintendent, Green Valley mine, Snow Hill Coal Corp., Terre Haute, Ind.; R. L. Vines, executive assistant, Ky. Dept. of Mines & Minerals, Lexington, Ky; Clyde Gibson, general superintendent, Glen Castle mine, Hanna Coal Co., Harrisville, Ohio; G. G. Grieve, senior consultant, Industrial Dept., National Safety Council, Chicago, and Charles Ferguson, director, safety div., United Mine Workers of America, Washington; and George H. Sambrook, director, mine inspection, United States Steel Corp., Pittsburgh, Pa.

Roof Bolting Progress

The 6,000-tpd Green Valley mine operates in the 72-in Indiana No. 3 seam under 600 ft of cover. The roof consists of gray shale with numerous slips and partings and can be classed as all bad, Mr. Kirk said. Bolting was adopted 100% in 1953 in place of previous roof support which consisted of heavy pin timbering using more steel rails against the roof than on the haulage roads. Present rules require that bolts be installed on 4-ft centers right up to the face before any other work is done. No workman is exposed to unsupported roof while discharging his duties. More than 1,800 bolts per day are installed and about 50% of these are recovered.

Turning to the safety and cost advantages of bolting, Mr. Kirk reported as follows:

"During the years 1951 and 1952, when conventional timbering was used, 35 accidents occurred from roof falls alone, for a total of 30,683 tons per roof fall accident. In 1955-56, we had 6 roof-fall accidents or 397,114 tons per roof-fall accident. Also, in 1951-52, a total of 1,037,905 tons of coal was mined, while in 1955-56 we mined 2,382,684 tons, or twice the amount of coal with 29 less roof-fall accidents. We have also mined over 5,700,000 tons of clean coal since our last fatality in June, 1951, and this is done under poor roof.

"On costs, I have taken only the costs of supplies and labor because I know you will agree with me that hidden costs such as cleaning up, delivering supplies and so on, all favor roof bolting. In 1951-52, under conventional timbering, our labor cost for timbering was 27.90c per ton, our supply cost was 29.12c per ton for a total of 75.02 per ton. In 1955-56, with roof bolting, our labor cost was 15.89c per ton and our supply cost was 27.60c per ton for a total of 43.49c per ton. Not only did we make our mine safer, but we saved 13.52c per ton."

The bolting at Green valley is done by two men on each mechanical unit. Bolting machines include four Joy RBD-11's on rubber tires, one RBD-12 on crawler tracks and two Chicago Pneumatic drills on crawler mounts. All are double armed and all are provided with integrally-mounted MSA dust collectors. In continuing studies of bolting, in the hope of entirely eliminating timber support, Green Valley officials are trying jointed bolts and new designs in expansion shells, seeking better anchorage and more efficient installation.

"I would like to state that the greatest contribution in stopping roof-fall accidents in the past 9 yrs has been good roof bolting," Mr. Kirk concluded.

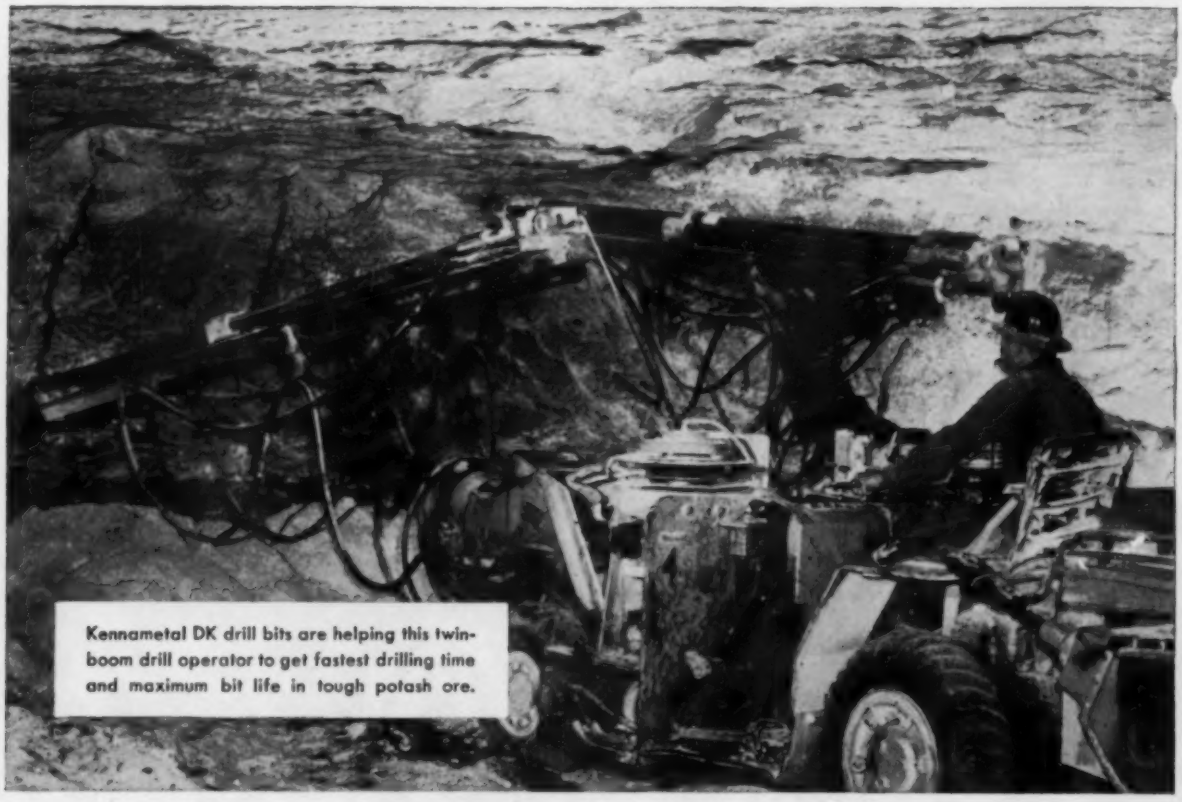
Haulage Safety

In reviewing the accident record of 1956, it becomes evident that there are great opportunities for making advances in combatting the No. 2 Killer, haulage accidents, Mr. Vines declared.

The principal cause of haulage accidents is the incidence of men being caught by moving equipment. Other causes are contact with low roof, being crushed between equipment and rib or timber, collisions, derailments and runaways. The chief physical factors involved are inadequate overhead clearance, defective haulage equipment, irregular roof and rib brows and the absence of derails or blocking devices on steep grades.

Unsafe practices which contribute to the bad record are riding in hazardous places, failure to block standing cars,

(*Continued on p 174*)



Kennametal DK drill bits are helping this twin-boom drill operator to get fastest drilling time and maximum bit life in tough potash ore.

KENNAMETAL* Bits cut tough potash ores fast . . . and cut bit maintenance costs, too

This mine outside Carlsbad, N. M., produces two types of potash ores — sylvite and langbeinite — and is a real proving ground for drilling and cutting tools. While the ores are harder than coal, the real problem comes from their toughness, which makes them hard to cut, and very hard on tools.

Tough jobs like these are a welcome challenge to Kennametal. Kennametal DK 1½" drill bits in a twin-boom driller, and Kennametal U11 and U1R cutter bits on a universal cutting machine, registered the performance records shown at the right.

The bit changing and grinding schedule is based on experience. Bits could run longer between regrindings, but increased power used, and increased drilling and cutting time, more than erase any advantage. This conservative schedule also gives more regrinds per bit.

A Kennametal Representative will be glad to demonstrate how Kennametal tools can help you to step-up mine yield and step-down mining costs. Just write KENNAMETAL INC., Mining Tool Division, Bedford, Penna.

Ask about complete line of Kennametal Cutter Bits, Drill Bits, Roof Bits, Augers, Pinning Rods, Accessories.

C-3045

		Langbeinite	Sylvite
Kennametal DK 1½ Drill Bits	Places per shift	6–8	8–12
	Holes per sharpening	Three 10-ft. holes	Twenty 10-ft. holes
	Regrinds, average	10	20–25
Kennametal U 1R Cutters	Places per shift	4–6	....
	Undercuts per sharpening	Two 36-ft. cuts	....
	Regrinds	20	....
Kennametal U 11 Cutters	Places per shift	....	7–10
	Undercuts per sharpening	....	Four 36-ft. cuts
	Regrinds	....	25–30

Kennametal U11 cutter bit

INDUSTRY AND KENNAMETAL ...Partners in Progress

*Trademark

High altitudes, narrow benches severely test this Michigan, yet every day it loads

400 tons of rock weighing 5,400 lbs per cubic yard

Up in the scenic Sapphire Mountains of southwestern Montana, Cummings-Roberts Company has one of the toughest rock-loading jobs you could find anywhere.

Part of the time, they blast and load coarse mountain-top granite . . . summer and early fall, they load fluorspar. No one needs to detail what a severe test the heavy, rough granite overburden gives to *any* loader. Fluorspar, however, is even worse. A heavy rock mineral, it weighs 5,400 pounds per cubic yard—over 850 lbs more per yard than in-bank granite (and 2,200 lbs more than pit-run gravel).

Proved by demonstration

Over the years, Cummings-Roberts has tried just about every kind of loader made. Last year to increase efficiency, their Michigan distributor, Miller Machinery Co., Missoula, suggested a Model 175A Michigan Tractor Shovel. "Frankly," Cummings-Roberts officials told them, "we don't believe *any* rubber-tire unit can load the stuff, much less do the work day in and day out. But we'll give it a try."

Result? John Taber, General Superintendent, wouldn't let them take the Michigan off the job.

Heaped loading assures proper blending

Today, the 133 hp 2¾ yard Michigan handles *all* loading of the super-heavy fluorspar. Production, with trucks on 600 ft one-way hauls to crushing mill, averages 400 tons per 7-hour day. The fluorspar, incidentally, varies considerably in grade from place to place through-

out the mine. It must be blended to give the grade desired for shipment . . . and this assignment goes to the Michigan, too. Its 27 mph mobility is a vital asset on this scattered loading; trucks never wait more than a few minutes for loading service.

Strips granite overburden — 500 tons per day!

In late autumn and sometimes in spring, the Michigan strips the granite overburden. Output averages *500 tons* per 7-hour day.

Downtime negligible

With all this rugged loading of super-heavy material, plus repeated back-and-forth maneuvering on narrow benches, plus continuous work at high 6,800 to 7,000 ft altitudes, the torque converter equipped Michigan has posted an excellent mechanical record. *To date, it has had only one minor breakdown!*

Also tows compressors, speeds other odd jobs

Operator Don Lindblom likes Michigan's powershift transmission, says its bucket action is the best he's ever worked with. "You can tip it back and fill it easily," he says. "I like the fact also that it takes only half-an-hour per day to refuel and lubricate." Foreman Waino Lindblom adds, "The Michigan has done a nice job for us! We particularly like its truck-like speed in moving from bench to bench." This mobility gives the Michigan some "spare time" to handle maintenance jobs scattered along 15 mi of mountain roads—cleaning rock rubble off benches so trucks and wagon drills can get through . . . hauling air compressors . . . digging culverts . . . even plowing snow.

Got a tougher job than this?

There *may* be a tougher materials-handling job than loading granite and fluorspar . . . but we're willing to bet a Michigan Tractor Shovel can do it faster, better, at lower cost than any other machine. To prove it, your Michigan Distributor will be glad to arrange a demonstration at *your* convenience. *You pick the jobs.*

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FOREMEN'S FORUM

VALUABLE EXPERIENCE is based upon keen observation which provides the facts on which our intelligence may work.

Putting Experience to Work

Acquiring experience and relating that experience to problems we now face helps supervisors become more effective. Here are some pointers on how to get the most out of your experience.

WE SPEND much of our lives getting ready for something. The something may happen tomorrow, like passing tests, or it may happen 5 yr from now, like taking over a new job. We have two principal ways of preparing for these eventualities, by study and by experience, explains the writer of an interesting essay on the uses of experience in the May, 1957 issue of the monthly letter of the Royal Bank of Canada.

In the simplest terms, what we seek is to have familiar factors to put into the equations we have to solve. In algebra and chemistry these factors are the knowns. Only through knowledge of the knows can one find the unknowns. In everyday affairs the knowns are the memories of experiences. The doctor employs his experience when he treats certain cases in special ways. A mechanic applies his full store of knowledge in assembling machines. Our laws exist because experience shows us that they work. As a matter of fact, we get into more trouble by ignoring the lessons of experience than in almost any other way. Here are some ways to gain and use experience.

When we say that experience is a valuable asset in business and in other activities of life we do not mean just casual acquaintance with events as they pass by. Experience is useful only if we have the capacity to learn from

When choosing your shovel feeder cable...

How much of a choice do you really have?

HIGH RESISTANCE TO MOISTURE is just one of the benefits you get with Rome's portable shovel cable. This tough cable—available with *both* oil-base and butyl-base insulations—provides long-life service under the most severe conditions.

Shovel cable may *look* alike . . . but you can find as many differences in cable as you can in mining operations. And your particular kind of operation deserves the one best cable.

That's why it's so important to choose your Type SH-D cable from a manufacturer who can offer you an unbiased recommendation as to the proper insulation for your own application.

Your choice of insulations. Rome Cable is one of only three major companies now making *both* butyl-base and oil-base insulations. This means you can describe your mining conditions to a Rome representative and get the one *right* insulation for your feeder cable. No matter what you want most in your cable—maximum resistance to heat, moisture, or ozone resistance—you can be sure of your choice when the cable is made by Rome Cable.

Tough jacket, too. Feeder cable takes a beating in most open pit mines, so you naturally want to choose a cable that's tough. Rome's mold-cured Rome 60 (neoprene) jacket provides maximum resistance to abrasion and crushing . . . and it's ideal for use in either wet or dry locations.

Choose carefully. No matter what type of shovel cable you need, take advantage of Rome's ability to offer you a *real* choice of insulations. When you present your shovel cable problems to your nearest Rome Cable representative, you can be sure he'll recommend the *right* cable—not just the best his company can provide. Contact him for more information—or write to Department 530, Rome Cable Corporation, Rome, New York.

ROME CABLE

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it and to apply the lesson to constructive ends.

The biggest jump a person makes in his career is the jump from doing a good individual job to the supervision of other people. Many who have made the change successfully have not learned much theory. They are products of the School of Hard Knocks, another way of saying they learned through experience. Young fellows on the way up should remember, however, that a "manager with broad experience" is not quite as effective as "a manager whose broad experience has developed his judgment." Judgment is more valuable than a mere brainload of varied facts which have been learned but not yet applied.

To point up the importance of applied experience, the author of the piece in the monthly letter quotes a Dun & Bradstreet survey of business failures in Canada as follows: Lack of managerial experience accounted for 9.4% of the failures in 1955. The next biggest cause of failure (29.8%) was due to unbalanced experience, described as experience not well-rounded in sales, financing, purchasing and production. Then followed incompetence as reason for 21.3% of the failures. Altogether, lack of experience or incompetence accounted for 96.7% of the total failures.

How to acquire experience is another matter. Problems may be solved in many situations by trial and error, but not if the trials are made in a bullheaded way. Trial and error efforts must have some content of intelligence, a pattern. Random efforts have no more chance of success than those of a fly beating its head against a pane of glass.

Man is the only animal that ever combined curiosity with experience and made the combination pay continuous dividends. He seeks to understand things that he has to back away from. He observes, builds a possible explanation, forms a plan and tries it out.

Some people think of Galileo's experiment in dropping things from the leaning tower of Pisa as merely an experiment in physics, but that is not its great significance. What he demonstrated was a new problem-solving method based on observation and experience.

Observation provides facts on which our intelligence may work. To observe successfully we must train ourselves to pay attention to details, seeing the apparently unimportant as well as the clearly important facts, the uninteresting as well as the interesting, the obscure and strange as well as the obvious.

If we depended upon our own experience for our learning we would find ourselves with scanty knowledge. The ambitious fellow finds someone of wider experience from whom he can continue to learn. He makes the experience of the other person an extension of his own.

Some men are never convinced they know a thing unless they have experienced it. They are pitiable in their refusal to listen to anyone but themselves, like a stubborn captain who has learned by many wrecks how to avoid the rocks. Others, some much wiser than us and some just as deficient as us, sought solutions to similar problems last week or a thousand years ago. We can use their experience by proxy.

How do we tap the accumulated experience of mankind? Merely reading the biographies of great men will not make us great. They have set up guideposts and warning signs, and they have even erected signs that draw our attention to pleasant views and exciting prospects. But we must step out on the highway, learning not only to see but to interpret in terms of our own lives the experiences about which they tell us. Taking a trustworthy record from the past and adapting it to the solution of a present problem is making the experience of others our own.

If we are called upon to solve different kinds of problems our experience must be broad. The workman and the supervisor who have had long acquaintance with their work find that they come again and again upon their own footsteps. The knowledge of individual situations they had 10 yr ago has broadened out into knowledge of principles. These are guides in similar situations today.

What is the difference between narrow experience and broad experience in their effect upon opportunity's for advancement. The first may make one an expert in a routine job, but it may not qualify one for a better job. The second does two vital things, it multiplies one's sources of inspiration and it enables one to trace cause and effect.

One thing that will not change is a principle. By distilling principles from our experiences we are building the essentials of future progress and solutions. No man should attempt to be original until experience has taught him what is usual and normal. Originality is deviation from the accustomed. First, we have the regular or routine in which we are expert. Then, by intuition or directed thought we get ideas for improvement.

Just as progress in becoming a skilled machinist consists largely in eliminating useless motions, so we must learn that some experiences must be passed by. They are neither harmful nor beneficial, and are therefore of no consequence to us. They would cause a jumble in our minds, like the clutter of an attic storeroom.

Negative experiences are nevertheless significant. During a long experiment one of Edison's colleagues remarked about "all this work for nothing." Edison replied, " . . .We have got a lot of good results. Look now, we know 700 things that won't work."

We are likely to bemoan the fact that our experiences are mostly of adversity, but we should not do so. Many great people tell us that their ability to cope with crises today comes from wrestling with adverse circumstances in their earlier years. Many who have lost positions or suffered bankruptcy have immediately started out on new work so successfully that they look back on the events of the past as having been the best things that could have happened to them.

By gathering experiences with eagerness, sorting them into categories, and welding them together with our own thought, we may be led to stand on the brink of great possibilities.

If a survey of our present state of education and experience shows a deficiency in view of our goals, what can we do? The writer of the monthly letter points out that we can become acquainted with people whose knowledge can extend our own experience. We can join associations that make a point of studying the problems of our business. We can enroll in evening schools. We can lay out a course of reading for ourselves through which we can profit from the experience of the past. Above all, we must avoid the dangerous opinion that we know enough.

To a successful man, or to the person headed for success, experience achieved by industry and perfected by time is a positive benefit. He knows that what he is to be he is now becoming.

A Boy's Essay on Anatomy

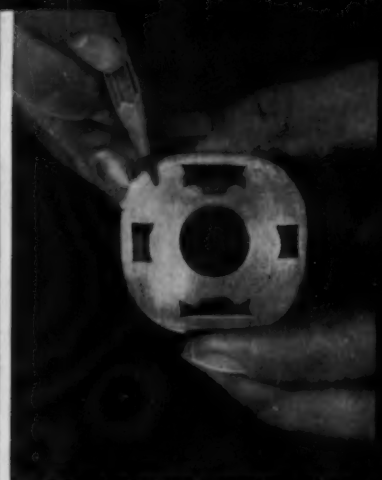
Your head is kind of round and hard, and your brains are in it and your hair is on it. Your face is the front of your head where you eat and make faces. Your neck is what keeps your head out of your collar. It is hard to keep clean. Your shoulders are sort of shelves where you hook on your suspenders. Your stumick is something that if you do not eat often it hurts and sometimes when you eat too much it hurts, and spinage don't help none. Your spine is a long bone in your back that keeps you from folding up. Your back is what's always behind you no matter how quick you turn around. Your arms are what you have to pitch with and to reach the jam. Your fingers stick out of your hands so you can throw a curve and do rithmatick. Your legs is what if you haven't two of you can't get to first base and neither can your sister. Your feet are what you run on. Your toes are what always get stubbed. And that's all except what's inside and I ain't never saw it.

—Selective Service in Alabama

Here's what to look for in a Shell and Plug...

1 Two-piece shell of O-B Bail-Type flexes easily, doesn't resist expansion forces created by bolt tension. Result is a quick-setting unit with more useful expansion force per ft./lb. of torque.

2 Three-step taper in O-B plug is designed to take up the slack in the bolt hole fast, develop a powerful "socket" anchorage, prevent high unit stresses at extreme top edge of plug.



3 Horizontal section of expanded O-B unit shows four-way expansion of shell fingers. Four-way distribution of stress permits high loading without distorting plug or pinching bolt threads.

4 Vertical section of expanded O-B unit shows solid "stack-up" of metal in bolt, shell, and plug. This solid metal contributes to superior strength of the socket formed by the plug.

5 Sectioned pieces of expanded O-B unit show heaviest markings in middle or "socket" area of plug. Lighter markings at top of plug prove excellent stress distribution at point of greatest expansion.

6 Section of steel pipe in which O-B unit was expanded for test shows that expansion forces are distributed evenly over all four shell fingers. Serrations on shell fingers make clean sharp impressions.

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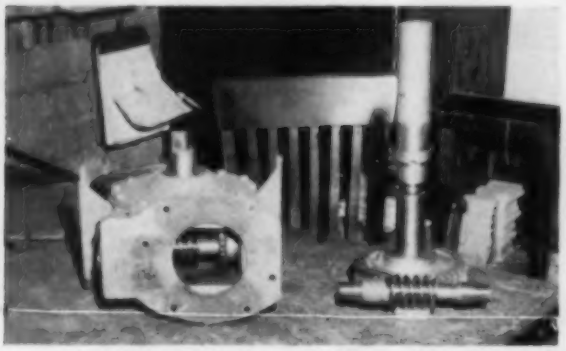

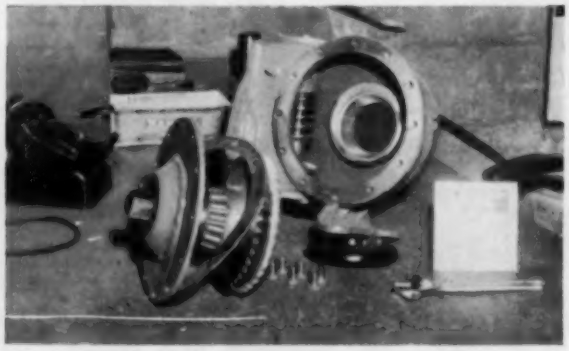

Redesigned Gear Case Cuts Maintenance Cost

A completely revised drill unit gear case for the Chicago Pneumatic RBD 30 roof-bolting machine has proven to be more efficient with less breakdowns and lower parts cost at Elk Creek Coal Co.'s No. 1 and No. 4 mines, Emmett, W. Va., according to John Porter, chief electrician, at No. 1 and Steve Dasovich, mining engineer, designers of the new drill head.

Major changes consist of a redesigned housing to fit the 573 motor, worm gear driven by a match gear and pinion, and bronze gear rim and center with drive shaft supported by bearings sufficient to withstand heavy thrust loads. Sufficient torque is delivered to permit tightening bolts with the same chuck used to drill the holes.

The company employed the Mine Specialty Co., St. Albans, W. Va. to make the unit and furnish repair parts. Different gear ratios, for various drilling conditions, are available, as follows:

Hard drilling	19½ to 1.
Medium drilling	15½ to 1.
Soft drilling	12½ to 1.

Guyan Eagle states that cost of converting the machines is offset by decreased downtime and maintenance cost.

Chain Conveyor Empties Low Cost Bin

A SAVING in material and labor was achieved at the Laurel Fork mine of the Warner Collieries Co., Mammoth, W. Va., by designing a long, narrow bin with a 15-in Long 500 DBH chain conveyor to remove the coal. The application of the chain conveyor made possible a simple bin design that could be built at a lower cost than one using a feeder.

Dropbottom mine cars cross the bin in 16-car trips, spreading an average of 56 tons in the bin. Capable of handling 80 tons, the bin measures 80 ft long, 10 ft deep and 4 ft wide. The bottom slopes to the chain conveyor so the coal will slide freely and not pack along the side. Baffles welded to the side slopes prevent the whole bin load from moving with the chain. Instead new coal slides onto the chain as other coal is pulled ahead from the bottom of the pile.

Pivoted Rack Eases Panelboard Rebuild

PANELBOARDS for underground mining equipment can be rebuilt easier and faster with the aid of this holder now used at the central shop of the Warner Collieries Co., Mammoth, W. Va. This device permits a worker to have both hands free to place and secure parts to the board. Mounted on an arm that can be swung back and forth in its pipe support, the rack permits the panelboard to be placed in the most convenient position for the worker. Small bins on top of the workbench contain components for the rebuild job and are within easy reach of the repairman.

US RUBBER CONVEYOR BELTS

Close-up of U.S. Giant Belt carrying raw coal from one of the two semi-portable hoppers of this overland conveyor system.

"A revolution in strip mining..." SAYS SUPERINTENDENT

"U. S. Conveyor Belt helps us save $1500 per week"

At the Will Scarlet mine near Stonefort, Ill., the outstandingly successful use of the first overland belt conveyor at an Illinois strip mine has the coal industry watching closely.

Installing a portable overland conveyor belt system, using a U.S. Giant® Belt, considerably reduced the number of trucks and crews, eliminated extra roads and high maintenance costs. The belts help permit large coal stockpiling for continuous operation: miners can continue working without a tippling operation — or the tipple can produce without a mining operation. The system can be moved to any location on the 3,000-acre tract. As the pit progresses overland, they simply add to the length of the belt.

Says the superintendent: *"Only 2 men are required to operate the conveyor. Our maintenance costs are very low. Altogether, the belt helps us save $1500 per week. We intend to install additional 'U.S.' Belting soon."*

This success story is the result of U.S. Rubber's exclusive "Three-Way Engineering," in which "U.S." engineers work closely with the engineers representing the mine operator and engineers representing the conveyor equipment manufacturer. This service and a complete line of conveyor belts are obtainable at any of the 28 "U.S." District Sales Offices, at selected distributors or by writing U.S. Rubber, Mechanical Goods Division, Rockefeller Center, New York 20, N.Y.

US RUBBER Mechanical Goods Division

United States Rubber

Heated Shanty Dries Boots

DRY BOOTS for pumpers and foremen are kept in readiness in this small block building at the Hariwick mine of the Duquesne Light Co. To drive moisture out of wet boots and keep them dry and warm until they are needed again, the company built this shanty at a central location where men could pick up a pair of boots on the way to a wet job. Heat from two electric lamps at the bottom of the shanty is confined in the structure by a steel door.

Mirrors and Pushbutton Simplify Truck Loading

EASY LOADING of 27-ton semitrailers is achieved at the Ohio River Collieries Co. with an unusual arrangement of mirrors and remote control of bin gates. As a driver pulls the front section of his semitrailer under a 200-ton bin, he reaches out the window and pushes a control button suspended from an adjustable counterweighted overhead arm. The pushbutton starts an electric motor operating the bin gates. At the same time the driver looks ahead and to his left into a pair of mirrors aimed at the top of his truck. He thus can watch the coal dropping into his truck. When front section of the truck is filled, the driver pulls his truck ahead and at the same time holds onto the pushbutton. When the truck is filled he pushes the control button and closes the gate under the bin. When the driver releases the pushbutton, counterweights on the adjustable arm pull the arm back to the original position in readiness for the next truck. The company reports that loading is speeded with this device.

New Fingerboard Cuts Controller Downtime

Changes in a reverse fingerboard have cut controller downtime of the 512 Goodman cutting machine 60% according to Jesse Marcum, chief electrician for Guyan Eagle Coal Co's No. 4 mine, Stowe, W. Va.

The new reverse consists of a fingerboard using Jeffrey 21C fingers and holders. The 21C finger and holders employ spring action and use a shunt to carry excessive current. The shunt furnishes ample carrying capacity for heavy loads and reduces heating between reverse cylinder and fingers. The fingers are insulated from the frame by using a small sheet of insulating material.

The disadvantages of the old reverse were that good contact could not be maintained at the finger and reverse-cylinder segments. Current flow through the fingers at excessive loads tended to heat them causing the fingers to lose tension and resulting in poor contact.

The reverse fingerboard is made by the Mine Specialty Co., St. Albans, W. Va. The fingers and holders are purchased from the Jeffrey Mfg. Co., Columbus, Ohio. Cost of converting the reverse is approximately $30.

All cutting machines at the No. 4 mine have been converted to the new type reverse. The company plans to change the reverse on 512 machines at its other operations.

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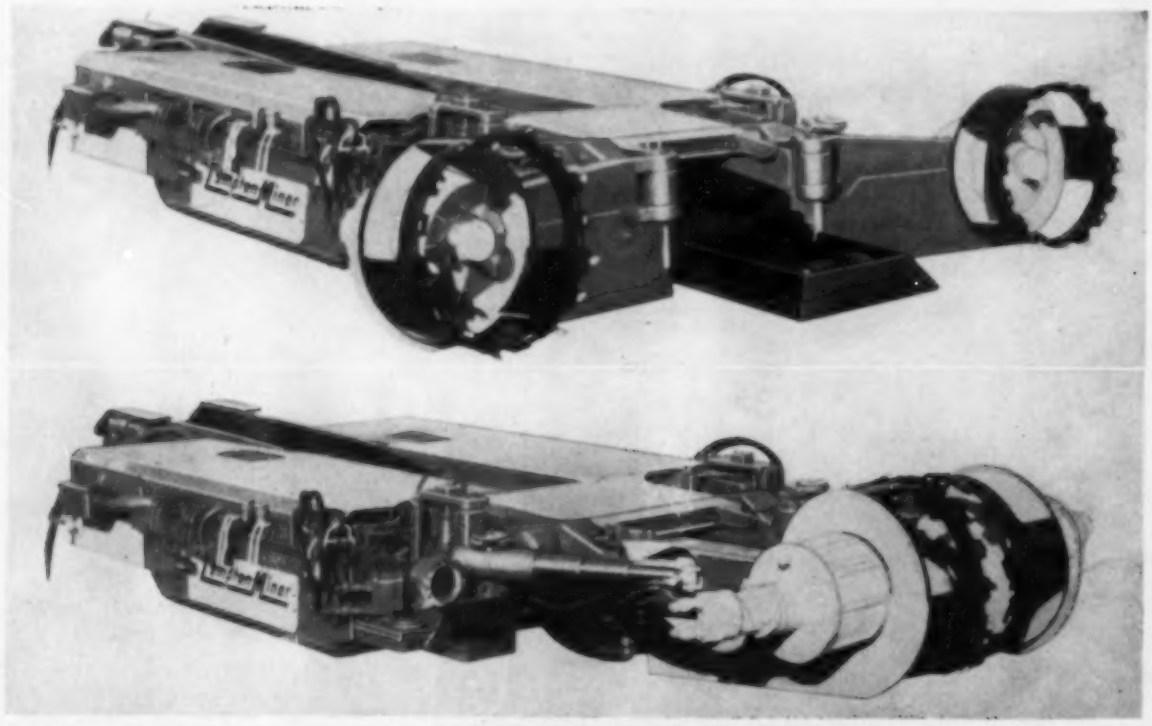


Low Coal Miner Equipped With Barrel Type Cutting Heads

A 27½-in high miner equipped with 34-in diameter twin barrel type cutting heads is being manufactured by Compton, Inc., to cut coal at a capacity of 5 to 7 tpm. Named the Compton Miner, the unit is equipped with all-hydraulic drives. Its mining height is 30 in to 4½ ft; its mining width 12 ft to 20 ft. On each pass the unit sumps 17 in to 24 in. Power is supplied by two Reliance 50-hp DC Super "T" motors. The Compton's barrel heads, which revolve at speeds from 0 to 43 rpm, are equipped with Kennametal double tapered shank bits. The barrel heads themselves vary with the seam being mined. The Compton machine's general dimensions are: length 24 ft; height 27½ in; weight 26,000 lb; width (crawler to crawler) 8½ ft; ground clearance 3 in; conveyor width 5 in; crawler length 6½ ft; and crawler width 11 in. Among the engineering features disclosed by the company, which has headquarters in Clarksburg, W. Va., are built in hydraulic bolting and timbering machines, which permit drilling 7½ ft from the face and 7½ ft across.

Wheel Flange Lubricator

The wheel life of locomotives reportedly can be increased from 30% to 300% by use of a new flange lubricator being manufactured by the National Aluminate Corp., 6216 W. 66th Pl., Chicago 38, Ill. The lubricator uses dry molybdenum disulfide in stick form as a lubricant. "Moly-Stick" lubrication, says National Aluminate, possesses high film strength under extreme pressures, and will not pick up dirt and sand. The company reports that already outstanding results have been obtained on railroad engines and switchers, which are subject to severe flange wear. Features: low cost, simple design, easy installation, and minimum maintenance requirements. Information can be obtained from the company's Dept. 571.

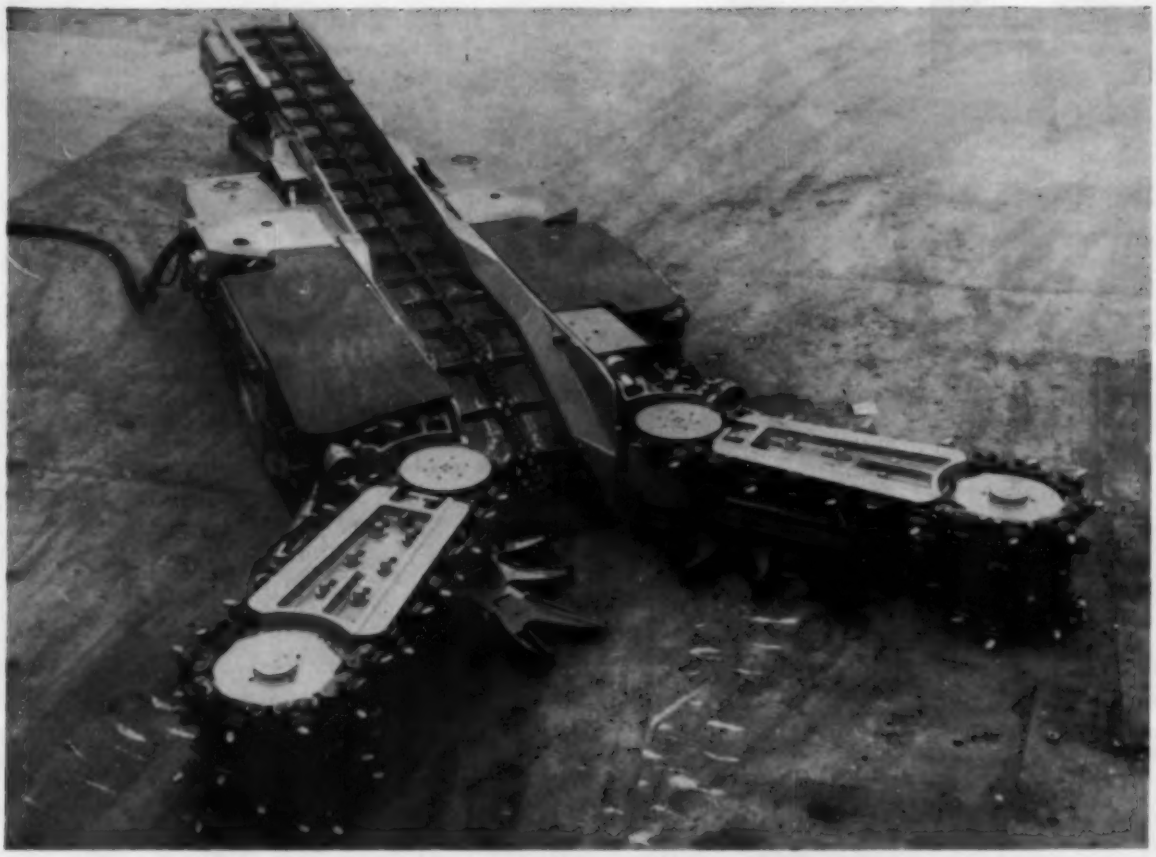
672 holes a day

...two-shift performance of seven RBD-30 Roof Bolting Units at the Island Creek Coal Company

Island Creek Coal Company's #3 Elkhorn Seam in Kentucky averages only 34 inches in height—a real tight squeeze. But not for the CP Roof Bolter! The RBD-30 is only 28 inches high. It moves into low seams, drills at 4 feet per minute, and sets the expansion bolt. On occasion, performance has reached 840 holes a day. Pantograph mounting of drill and bolt-setting motor eliminates need for repositioning. A six-inch auger adjustment on the telescopic chuck overcomes the problem of roof irregularities. Available in self-propelled and standard types—both ideal for low coal conditions. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

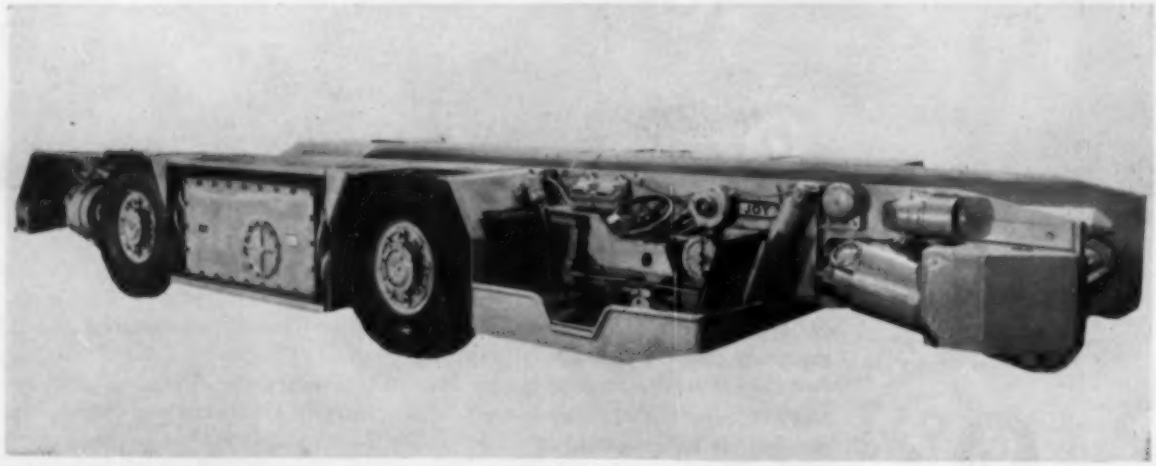
Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



Lee-Norse Miner Designed for Low-Seam Coal

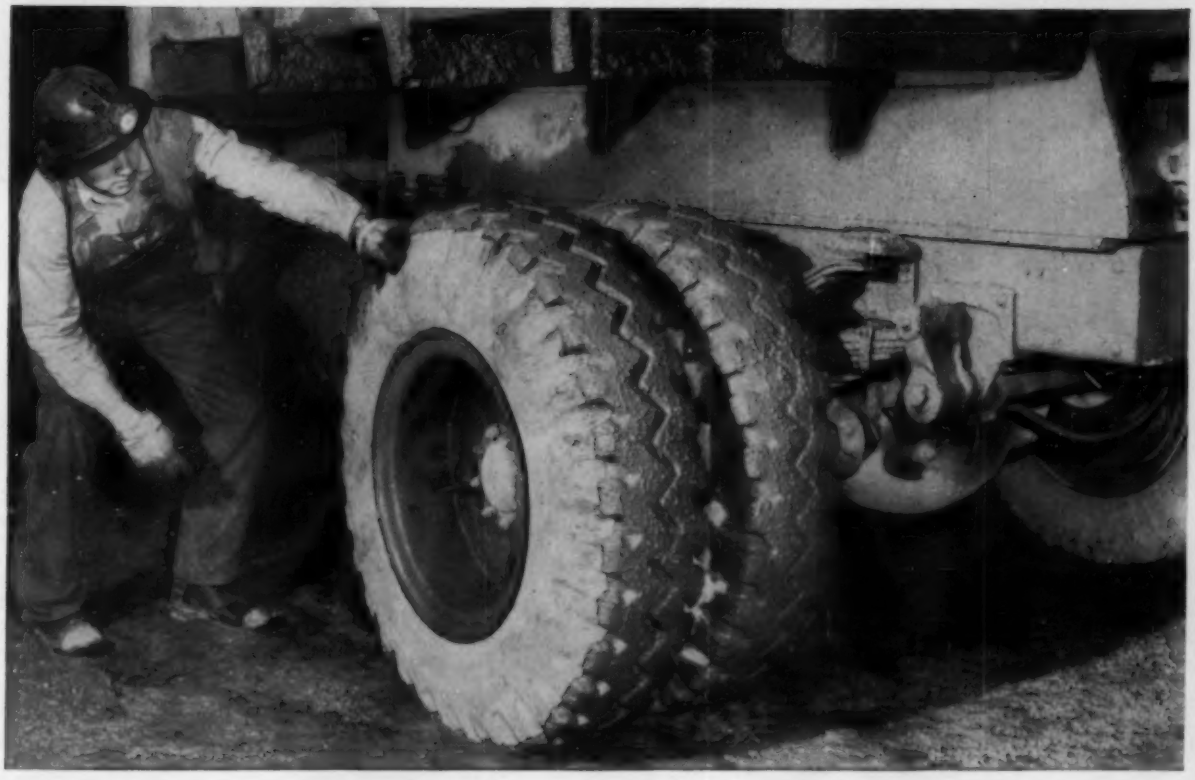
Lee-Norse Co., Charleroi, Pa., has introduced an entirely new miner that is designed for mining lowseam coal from 30 in to 48 in. The miner is capable of cutting 2 tons per minute, in a 14-ft wide swath. The machine's height is 26 in, its width 7 ft 9 in. Length is 28 ft 10 in, total weight 32,000 lb. Two 40-hp motors power the miner, which is designated Model LCM 26. Lee-Norse has designed it to hold 100 cutter bits.



33½-In High Shuttle Car Hauls 4 to 5 Tons

Joy Mfg. Co.'s newest shuttle car is the 33½-in high 16SC, a car designed to carry 4 to 5 tons of coal. It is equipped with two 10-hp traction motors and a two-speed conveyor drive, powered by two 5-hp conveyor motors. Some highlights: an adjustable discharge conveyor with reversible drive; a maximum payload of 6 tons; and hydraulic

B.F.Goodrich



How Eagle-Picher gets 2 to 3 retreads from B.F.Goodrich all-nylon tires

THE EAGLE-PICHER COMPANY mines and processes lead and zinc ore in northeastern Oklahoma. Inside the mine, dump trucks haul 9.5-ton loads, trailers haul 15-ton loads. Diesels used for outside hauling average 15¾ tons per load. Eagle-Picher used B.F.Goodrich *all-nylon* tires for all these jobs.

The B.F.Goodrich Rock Logger tires above and Universal tires (below left) work inside the mine on a bed of slippery flint rock, yet carry over 3,500 tons a month and give 18 months' service before retreading. Traction Express tires (below right) cover up to 4,000 miles a month on gravel roads. In spite of this rugged work, Eagle-Picher gets as many as 3 retreads from B.F.Goodrich tires!

The B.F.Goodrich *all-nylon* cord body is stronger than ordinary cord materials, withstands double the impact and resists heat blowouts and flex breaks. That's why the B.F.Goodrich *all-nylon* cord body outwears even the extra-thick tread, *can be retreaded over and over!* You get more hours of tire service at lower cost per hour.

Your B.F.Goodrich dealer has a tire for every kind of mining work. Ask him to show you the tires that will save you money or write: *B.F.Goodrich Tire Company, A Division of The B.F.Goodrich Company, Akron 18, Ohio.*

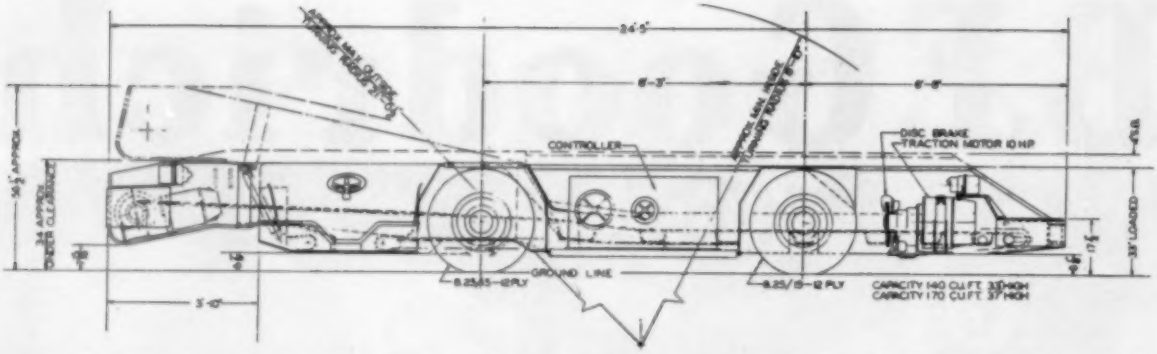
THESE UNIVERSAL tires carry 15-ton loads, often make over 250 trips a month on slippery, razor-sharp flint rock.

ALL-NYLON Traction Express tires work 48 hours a week hauling ore from Eagle-Picher mine. Company uses 3 types of BFG tires.

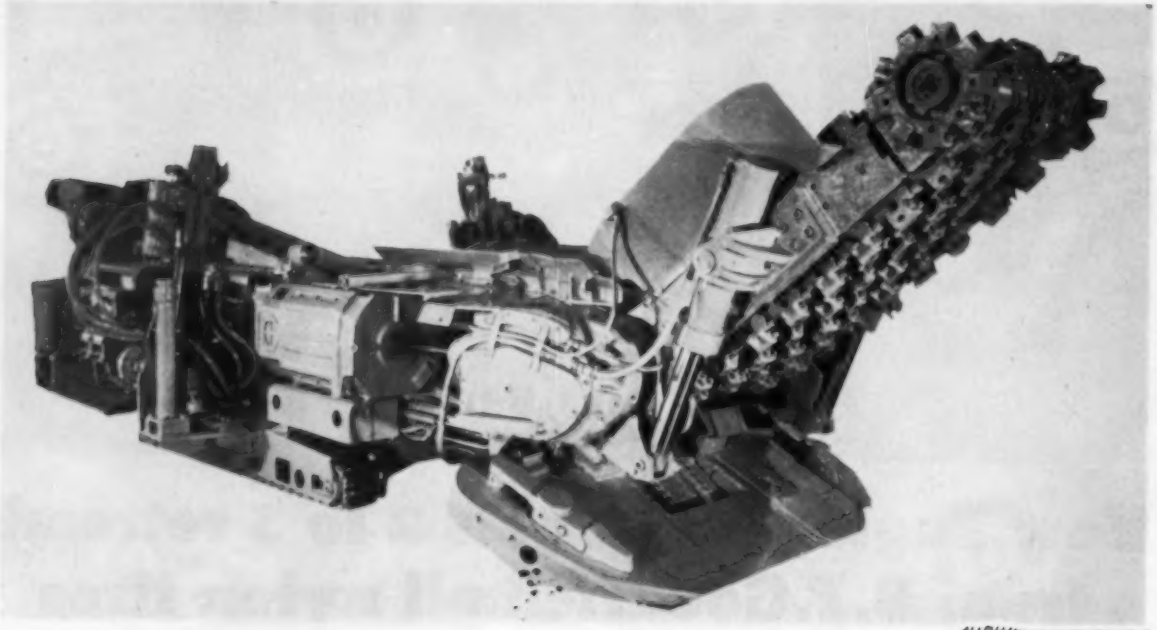
Specify B.F.Goodrich tires when ordering new equipment

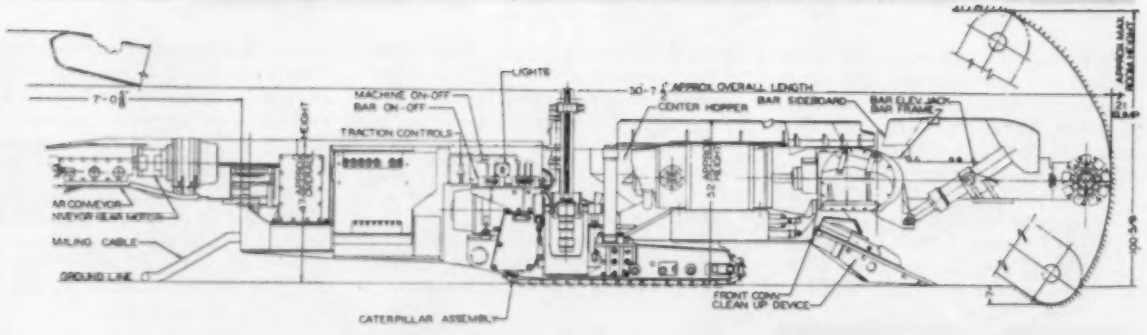
B.F.Goodrich
FIRST IN RUBBER

Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book



power steering. Joy expects to replace its 6SC shuttle car with the 16SC because of "more rugged construction, larger capacity and faster speed." Tramming speeds, according to the company, are 4.1 mph with a full load and on a level; 2.75 mph on an 8% grade; and 2.30 mph on a 15% grade. Empty the car will tram at 4.7 mph on a level; 3.30 on an 8% grade; and 2.8 mph on a 15% grade. Literature available from the company.





Continuous Miner Gathers Coal, Cuts It At 4.5 Tpm

One of Joy Mfg. Co.'s newest continuous miners is the 1CM-3, a unit that has among its design features 21-in sumping, a gathering arm cleanup mechanism, and a capacity of 4.5 tpm. In addition, the 1CM-3 is equipped with direct-acting shear jacks and an 8-in deep conveyor. The basic machine is 47 in high. Equipped with 36-in travel roof drills, the 1CM-3's height is increased to 63 in. Cutting range, with a standard 5½ ft bar, is 103 in above the mine floor, 7 in below. Tram speed is 39 fpm. The 1CM-3 is 92 in wide; with roof drills width is increased to 117 in. It cuts a maximum room 21 ft wide, a minimum room 11 ft wide. In all, eight motors are used to power the machine: two 100-hp cutting motors; two 7½ hp traction motors; two 10-hp conveyor motors; one 15-hp pump motor; and one 26 hp drill pump motor. Company address is: Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa.

In restricted areas,

Rear-Dumps outmaneuver, outproduce ordinary haulers

For fast maneuvering in confined loading areas... hauling heavy materials over poorly-graded winding roads, and dumping safely over high embankments... investigate the advantages of heavy-duty Tournapull® Rear-Dumps.

Short turns speed loading cycle

Take the 22-ton "C" Rear-Dumps, for instance... middleweights in the LeTourneau-Westinghouse line. In confined loading areas, where width of footing is limited, "C's" short 28'8" turn in haul position (only 20'8" in dump position) comes in mighty handy. It enables operator to maneuver safely and easily... spot fast under dipper. Compare this tight-turn ability with that of ordinary dump trucks in the "C's" tonnage hauling class.

Also, 'Pull's low rear-entry (5'8") lets shovel operator swing bucket in and out of bowl at low dumping heights. Shovel can heap a good load in a hurry, with minimum spillage.

3,762 sq. in. of brake surface

Multiple-disc air brakes on all 4 wheels give 3,762 sq. in of braking surface... provide ample safety for downhill haul.

A special safety feature for hilly work areas is the optional *Electrotarder*. It provides auxiliary non-wear, electric-resistance braking through generator on drive-shaft... virtually slows machine to a "walk" without braking.

Dumps fast, safely... keeps firm footing

To dump, operator wheels and spots fast at edge of target area. Setting independently-controlled rear-wheel brakes only, he activates electric hoist motor to raise body into "dump" position. As body raises, wheelbase shortens... swinging bowl below and between rear wheels. This keeps rocks, stones, etc., from piling under hauler or against rear wheels during dump. Front-wheel drive keeps power and traction on solid footing, well ahead of rear wheels.

Rear-Dumps have 4-way built-in protection against bogging down: 1) Power-transfer differential automatically transfers most of the power from slipping wheel to wheel on firm footing. 2) Power-steer through geared kingpin "walks" prime-mover out of ruts — should both drive wheels bog down. 3) "Hump" action, in dumping, brings rear wheels forward as body raises, pushes front wheels forward as bowl is lowered, to inch hauler out of soft footing. 4) Big, low-pressure tires on all wheels float over, don't dig into loose materials, keep traction always.

Interchangeability adds profits

Tournapull Rear-Dump's "bonus" is its interchangeability feature. Rear-Dump body can be easily switched with 18-cu. yd. scraper, 20-ton flat-bed hauler, bottom-dump or crane. Change-over, using same 2-wheel prime-mover, takes just a few hours.

At this pit, two C Tournapull Rear-Dumps are loaded with rock and overburden by a large-capacity shovel. Here the machine's big air-brakes, simple electric controls, positive power-steer, and 90° turning radius, enable it to spot fast under the dipper, maneuver safely and easily over boulder-strewn surfaces.

'Pull's operator backs "C" right up to edge of embankment. Streamlined bowl sheds material readily, clear over bank. Clean unloading cuts costs for dozer cleanup. Front-wheel drive permits fast, safe getaway after dump.

You can get bigger production at lower cost with Tournapull Rear-Dumps, available in 11, 22, and 35-ton capacities. Let us show you owner-verified reports on these machines working in pits all over the world.

CR-1205-M-1

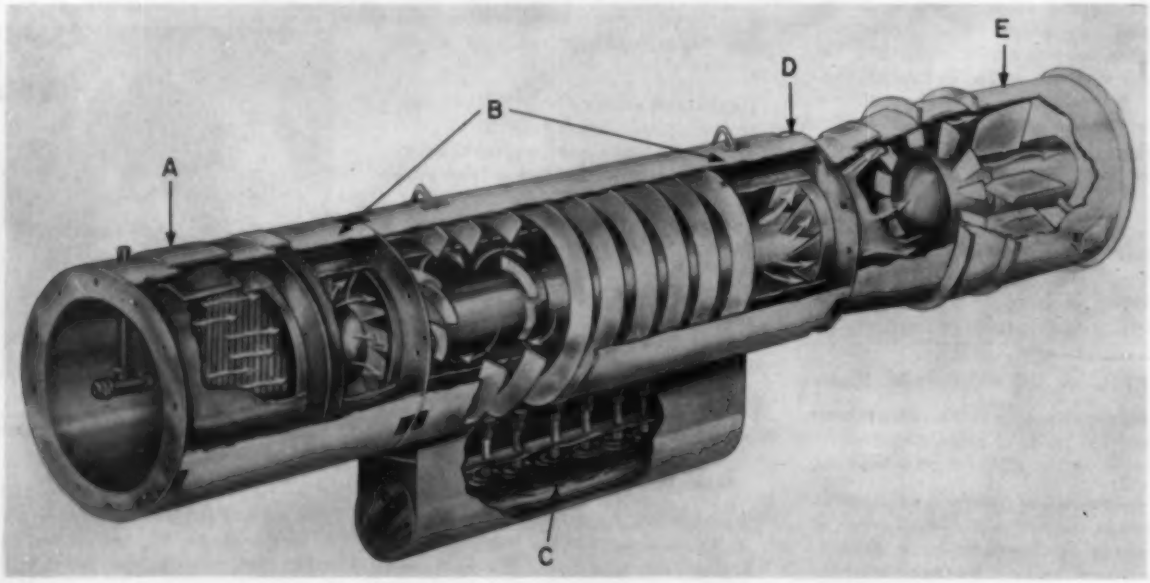
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

Autocar Develops 600-Hp Truck

The Autocar Div., White Motor Co., Exton, Pa., has developed a 600-hp rear dump truck for off-highway use, which is said by the company to be the most powerful single engine truck. Designated the AP-40, the truck is designed to haul 40-ton loads in its 27-yd body. Its top speed is 33 mph. The engine is a V-type, turbocharged 12-cylinder Cummins diesel, an engine that has been used previously in locomotives and stationary power plants. A 30-hp motor is used to start it. The adaptation of the engine to the AP-40 was made possible, according to Autocar, by the Fuller R-1550 transmission. Another engineering achievement, says Autocar, is the truck's all-welded, box construction frame which is made of 1-in carbon steel. The AP-40 drives on all four wheels in the tandem rear. If either set of wheels loses traction an air-powered lock applied by the driver permits the other axle to continue diving.

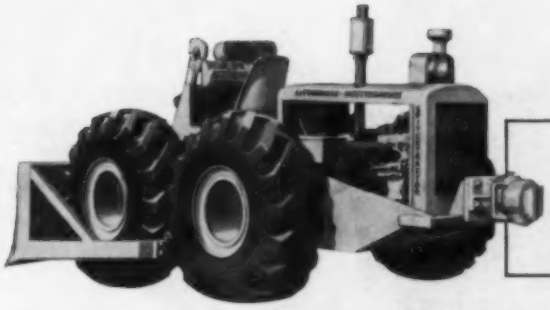


Efficient Dust Collector In Small Package

Joy Mfg. Co. entered the dust-collecting industry last month by introducing the Microdyne dust collector, a wet, inertial type unit said to be 1/10 to 1/20 the size of comparable equipment. During a press conference in New York the company cited test figures which indicated that the Microdyne has an efficiency of 99% or more in collecting dust

NEW
double-duty
SwitchTractor

Famous high-speed work-and-run tractor now available with standard railroad couplers. Railroad drawbar attachment now makes this famous high-speed tractor even more versatile, gives you the plus value of a go-anywhere off-track switcher for car-spotting work.



SwitchTractor

dozes, hauls, switches freight cars

Ten years hard use has improved and perfected the work-and-run Tournatractor. Thousands have proved their value in hauling, dozing, pushing, grading, scarifying, and compacting in practically every country in the world.

Doubles value of Tournatractor

Now — with the new *SwitchTractor* application—this versatile unit gives you added utility. Equipped with standard railway coupler at the rear, SwitchTractor does double-duty, switches freight cars on your siding, in yard or pit. With wide 8′4½″ tire gauge, rubber-tired switcher straddles tracks of all gauges.

SwitchTractor often eliminates the need for private switch engines and engineers, saves charges and delays of railroad switch service. Your single SwitchTractor and operator may well handle all your scattered tractor-dozer work — plus whatever freight switching is required.

Off-track travel cuts switching time

Rolling on big, low-pressure rubber tires, 208 hp machine always takes the shortest route to the job. SwitchTractor can either push rail cars (with its dozer or push-plate), or pull with its coupler-equipped drawbar at rear. Tractor can start 18 empty or 5 loaded freight cars, move them up a 1% grade easily.

60% vs 30% coefficient of friction

Rolling on big rubber tires over ballast and ties, not on steel wheels over steel rails, SwitchTractor develops much more coefficient of friction (60% compared to 30%) than track locomotive of *twice* its weight. That means you have plenty of tractive power.

Worthwhile savings with SwitchTractor

If you have to move freight cars in your operations, investigate this versatile new SwitchTractor. Get all the facts on how this coupler-equipped go-anywhere tractor can save money for you in equipment and manpower economies.

SwitchTractor—Trademark, Tournatractor—Trademark Reg. U.S. Pat. Off. ST-1075-M-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

particles #5 microns in size or greater.

The Microdyne is a cylindrical device and has two essential parts—a mixer section and an eliminator section. Dust-laden air or gas enters the unit at the mixer section (A) where impingement takes place. Each dust particle is enveloped in water as it passes through a fine spray. The air and entrained water-enveloped dust pass through turning vanes as they enter an eliminator section (B). The vanes impart a helical motion, causing a centrifugal force which separates the particles from the air. The dust-laden water is captured at the periphery of the eliminator section in blind louvres which are connected to a disposal sump (C) at the bottom of the unit. Cleaned air passes out of the eliminator section through straightening vanes "D". If sufficient pressure to drive gases is not available ahead of the Microdyne a vane-axial fan (E) can be attached at the rear of the unit.

The Microdyne was developed by Joy's Industrial Div. at research laboratories in Elder's Ridge, Pa. The unit is made in rated capacities up to 64,000 cfm.

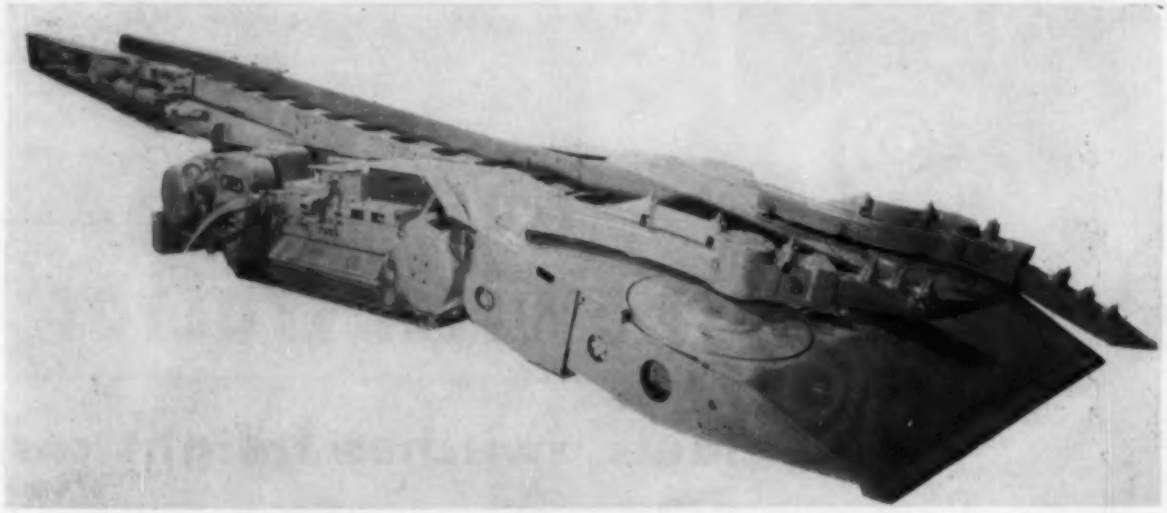
Joy says it began to investigate a number of years ago a way to collect coal dust stirred up by the company's continuous miners. Officials considered existing dust collection equipment too heavy. In addition most air cleaning equipment had to be operated under conditions nearly impossible to meet in a coal mine.

A few units are being used on the line, but not in coal mines where the problems of mobility, size, mounting and return air must be solved.

In the Lake Superior region, however, a 16,000-cfm Microdyne is keeping atmospheric dust count within the standards of the U. S. Bureau of mines. The collecter is situated in a crusher room 1,300 ft underground.

Other units are in use at Anaconda mines to provide a supply of dust free air for underground workers.

Four more Microdyne units are being used by Allegheny Ludlum Steel's Breckenridge plant near Pittsburgh in the company's grinding department, where the surfaces of steel slabs are ground.



Joy Producing 26½-In Loading Machine

The 14BU9, a loader manufactured by Joy Mfg. Co., is a 26½-in machine similar to the higher 14BU-7 and the 14BU-8 units. The new series contains a parallel traction drive circuit which minimizes the inrush of current and promotes greater motor and resistor life, according to Joy. The width of the 14BU9 is 74 in, its length with a standard conveyor, 23 ft, 1 in. Capacity is 5 to 6 tpm. The width of its conveyor is 24 in, depth is 6 in. It is designed with a 45-deg swing either side of center. Tram speeds are 120 fpm (high), 60 fpm (low). Trailing cable is 300 ft.

Mobile, Rapid Drilling Unit

Mobility and rapid setup are among the main features of a truck-mounted rotary air drill being manufactured by Schramm, Inc., 900 E. Virginia Ave., West Chester, Pa. The entire unit is known as the Schramm Truck Mounted Rotadrill. Schramm reports that field tests show the drill will make hole 600% to 700% faster than the best churn drilling technique. Schramm also points out that since the unit is an air drill no mud is required. Thus there is no mud loss from underground caverns, cracks, and fissures. Drilling is often faster and bit life is longer because of prompt hole cleanout. In addition setup time is cut, too, since there is no mud pit to dig, or mud box to fabricate. The only time required is the time needed to raise the mast, level the rig, and put on a bit. The Rotadrill's operation is accomplished by a reversible hydraulic motor-driven head mounted on a carriage that rides tracks mounted on the mast. The hydraulic head and special slip holders eliminate the need for a rotary table. Maximum down pressure is 24,000 lb, maximum lifting pressure 19,000 lb. Holes can be drilled to 700 ft with 4½-in drill pipe, to 1,500 ft with 2⅞-in pipe.

Announcing HI-CAP*...

New Du Pont Explosive

designed for economy in blasting operations

Hi-Cap . . . the newest addition to the Du Pont explosive family . . . will assure economy in many blasting operations.

The reason is simple. Hi-Cap answers the demand for a low-priced, cap-sensitive, water-resistant explosive with high strength for all-around shooting.

Hi-Cap is available in 12½ and 25 lb. bags for pouring into small diameter dry holes and in 23-G cartridges of 5" diameter and above.

When Hi-Cap is poured in small diameter holes, a 40% dynamite primer, 1¼x8, is recommended for detonation.

For maximum safety, charges of Hi-Cap should be detonated with Primacord in the usual manner using Du Pont MS delay connectors whenever practical. With this method of firing, you have no blasting caps on the job until the shot is ready to fire.

Notice how the 23-G cartridge is crimped to facilitate loading in the hole. The tape bail serves as a carrying handle, and also for lowering. Since no outside case is required for the 23-G cartridge, there is no packing material or debris left to clean up after the shot is loaded.

Call your Du Pont representative for more information on low-priced Hi-Cap or write: E. I. du Pont de Nemours & Company (Inc.), Explosives Department, Wilmington 98, Delaware.

**Registration applied for.*

DU PONT EXPLOSIVES

Blasting Supplies and Accessories

DU PONT

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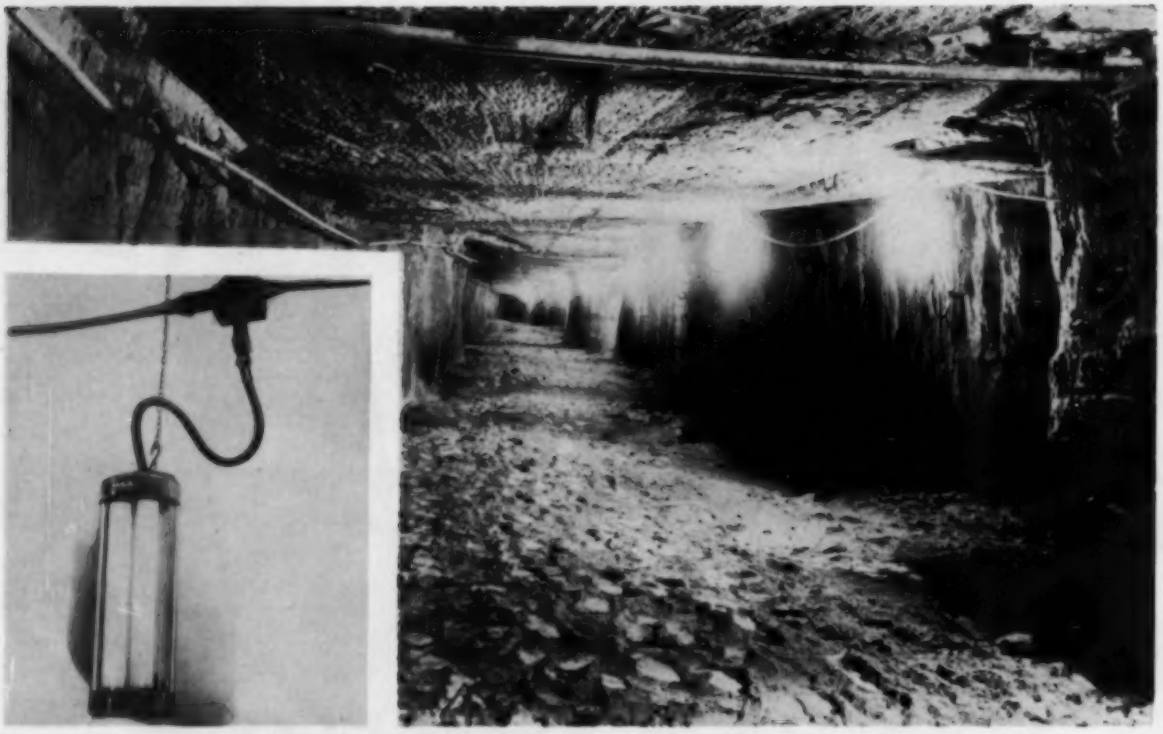
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

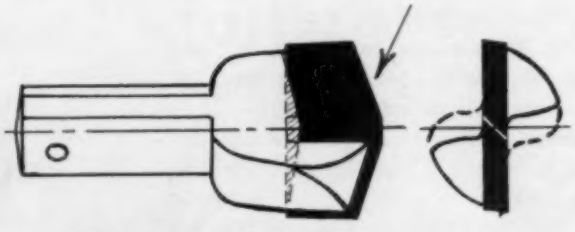


M-S-A Making Permissible Lighting Systems

Mine Safety Appliances is manufacturing and distributing M-S-A Permissible Mine Lighting Systems, which have been assigned U. S. Bureau of Mines approvals 29-1 and 29-2. The systems include fluorescent mine lamp fixtures, cables, cable connectors and distribution panels with circuit breakers. The systems are not designed to eliminate the need for individual cap lamps, but are intended to provide supplementary illumination, principally at the face. One system consists of an unground, isolated two-pole circuit and two-conductor cable. The other system consists of a grounded three-pole circuit and three-conductor cable. Both systems use the M-S-A fluorescent lamp fixture, which cannot cause an explosion even if broken in an explosive mixture of methane and oxygen, according to Mine Safety Appliances. The systems operate on a 60-cycle, 118-v single phase power supply, and were tested at an underground mine where conventional room and pillar mining was conducted. The seam (photo) was 6 ft. During the tests, which lasted more than a year, there were no accidents in the illuminated section. The company says 10 accidents occurred in the other five sections being operated at the same time.

Auger Equipped With Two Heads

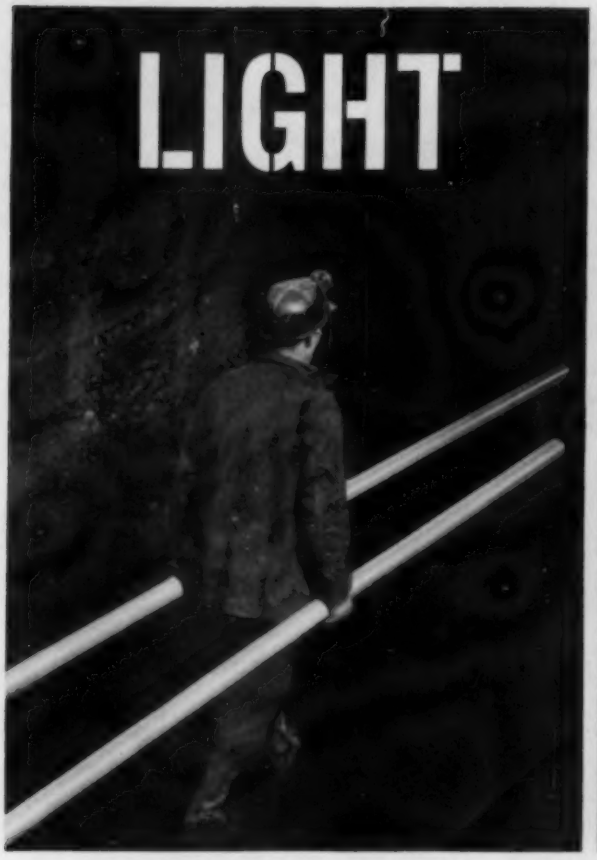
Compton, Inc., Clarksburg, W. Va., has introduced the "twin head" coal auger which is designed, the company says, to make thin seam auger mining profitable. The unit can be equipped with heads 24 to 32 in for drilling depths to 150 ft. Compton says the "Twin" is 29 ft long, weights 26 tons, and carries 24 12½-ft auger sections. It is powered by one 175-hp diesel and one 100-hp diesel. Among its features, which are found on other Compton augers, are: the ability to drill within 4¾ in of a bottom; an elevating conveyor as an integral part of the machine; racked augers; hydraulic jack legs with self-leveling pontoons for drilling up to 150 ft without misalignment.



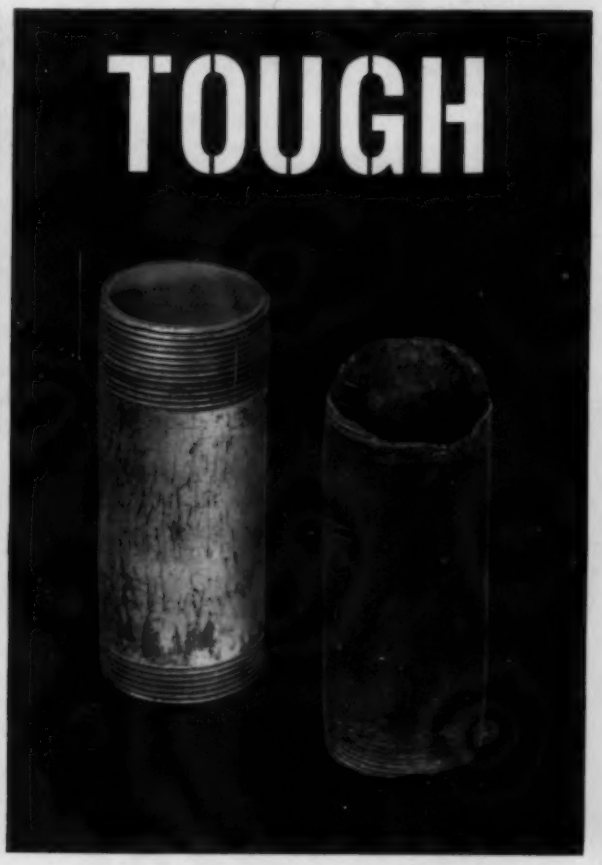
Free-Cutting Roof Drill Bit

General Electric's Metallurgical Products Dept., Detroit, Mich., has developed a roof drill bit which is said o provide free drilling action, simplified maintenance and maximum use of the bit's cemented carbide cutting edges. The bit, named the PTV solid carbide insert type, is built with

Aluminum Mine Service Pipe



One man carries two 20 ft. lengths of aluminum mine service pipe easily.



Aluminum pipe (left) stands up after 60 days in acid mine. Steel pipe, subjected to same test, is at right.

Two facts about Reynolds Aluminum pipe add up to lower costs all around in mine drainage: Aluminum pipe saves up to 90 percent of the weight of heavy steel pipe. A 20 ft. section of 3 in. Schedule 5 aluminum pipe weighs only 21 lb. . . . compared with 152 lb. for Schedule 40 steel. This, of course, means faster, easier handling and installation, and less labor.

Long range costs are cut, too, with Reynolds Aluminum pipe. It lasts longer, resists corrosion better. In a recent test installation, a section of aluminum pipe was only slightly pitted after 60 days in a mine where water contained more than 3.5% sulphur. Steel pipe in the same test became unusable.

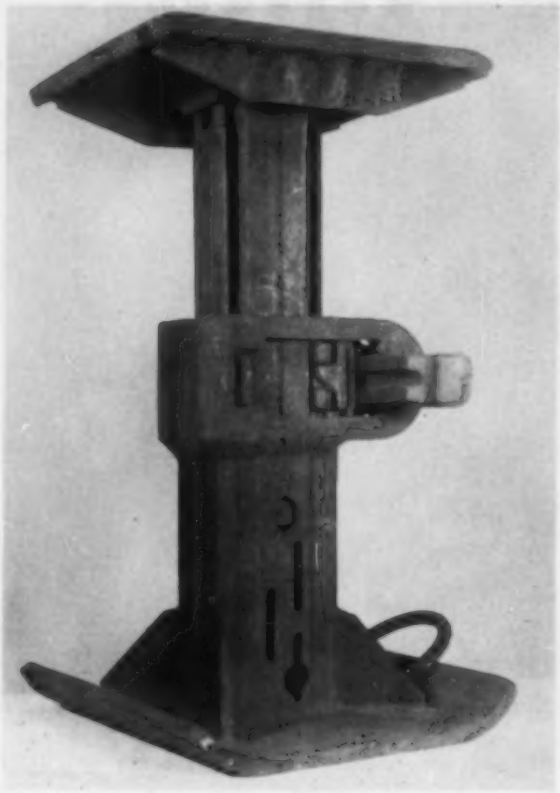
Get details on this cost-cutting mine service pipe now. Write for "Reynolds Aluminum Mine Service Pipe" brochure. *Reynolds Metals Company, P.O. Box 1800-NQ, Louisville 1, Kentucky.*

See "CIRCUS BOY", Reynolds exciting dramatic series, Sundays, NBC-TV

REYNOLDS ALUMINUM

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

less mass in the steel forging, a design that is reportedly responsible for the free cutting action mentioned above. By reducing the bit's mass, says GE, there is less obstruction in the way of cuttings. The company also points out that the V-shaped design of the bit's insert leads to a more uniform carbide tip. As a result, the roof drill bit is easier to maintain. The insert design also permits maximum use of the carbide insert to a point where the bit is no longer useful because of wear. This, says GE, means less unusable carbide is scrapped when the bit loses gage or serves its useful life.



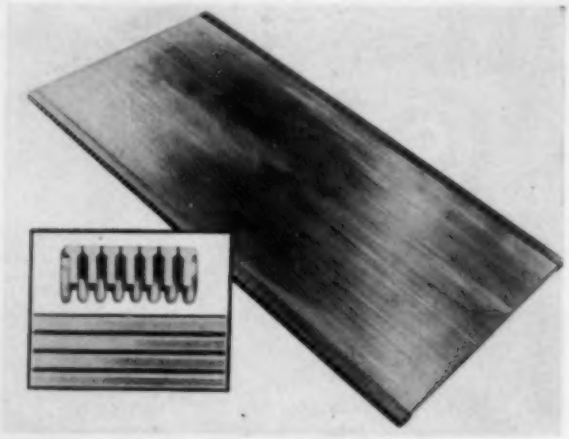
Steel Support Replaces Wood Cribs

Union chock prop, developed by Eisenwerk Wanheim Gmbh., and distributed in the United States by Kurt Orban Co., 22 West Putnam Ave., Greenwich, Conn, is equipped with large floor and roof plates to provide crib-type support in a more efficient manner. The new support provides an advantage in that it may be set in place with an initial loading of 3-4 tons, thus preventing the displacement of the roof which occurs when timber cribs yield in assuming load. The Union prop yields at a total load of 88 tons. In the units now available minimum extended length is 2 ft 4 in and maximum extended length is 5 ft. The bed plate is curved to permit the support to be skidded along the floor, and the roof-plate is swivel-mounted to compensate for unevenness in the roof. The chock prop may be released from a distance of 15 ft through the use of a hydraulic device also supplied by Kurt Orban. Then the unit may be pulled into its new setup position by a chain or rope attached to the hitch on the floor plate. Dimensions: roof plate, 190 sq in; base 248 in.

GE Bit Designed With Less Mass

Cleaner cutting action, easy re-grinding and less power consumption are said to be the results of a new steel forging design utilized in a bit developed by General Electric's Metallurgical Products Dept. The bit is called the CCA1 and

can be used on coal recovery augers, conventional and continuous cutting equipment. The tool's versatility says, General Electric, is the result of employing less mass in the bit's steel shank (photo), but providing more supporting strength under the carbide tip.



New Screen Reduces Blinding

Wedge-Wire Corp., Wellington, Ohio, has developed a new heavy duty Kleenslot screen named the "Migh-Tee." Its applications are for dewatering, screening, washing, extracting, filtering, and sizing. A feature is a new special profile designed to provide added wearing surface between wires. A new assembly, too, is said to contribute toward reducing blinding and clogging. The "Migh-Tee" is also adaptable to vibrator applications.

Four-Wheel Drive Tractor

A four-wheel drive tractor equipped with a 335-hp engine has been introduced by the M-R-S Mfg. Co., Flora, Miss. The tractor, designated Model 200, is designed for

"We push a big load faster—thanks to the torque converter in our D8"

EDD HOPKINS, Pit Superintendent
Whitley Strip Mining Co.

When you buy a powerful CAT* D8 Tractor, you have a choice of direct drive with oil clutch or torque converter drive. Whitley Strip Mining Co., Williamsburg, Ky., decided on the torque converter.

"We really like it," says Edd Hopkins, pit superintendent. "We push a big load faster—thanks to the torque converter in our D8. Since we use this machine for stripping, it speeds our work and gives us bigger production. As it digs into the overburden, engine speed automatically adjusts to the load."

Overburden, which is mostly sandy clay, runs approximately 45 feet deep. Present mine production is 400 to 500 tons of coal daily. The D8 also is used for leveling spoil bank.

The torque converter in the big yellow machine is a three-stage unit with a torque multiplication of 5 to 1. A single-plate, dry clutch is built into the housing. A three-speed forward, three-speed reverse transmission is specially designed for use with the torque converter. For easy servicing, a removable universal joint allows removal of the transmission.

In other ways, too, the powerful Caterpillar D8 Tractor is designed for a long, productive life. There is 191 flywheel horsepower in its new engine, which also features the reliable Cat-built fuel injection system, new governor, new fuel filter, new water pump, new oil cooler, and new larger radiator. Your operator's job is made easier because of in-seat starting and convenient controls with hydraulic booster.

This is the machine which has created a new concept of "a day's work" in coal handling. It was designed to lower costs and increase your production. Call your Caterpillar Dealer today. Ask for a demonstration . . . on *your* job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK

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METHOD OF PIPING

VICTAULIC HAS EVERYTHING...

VICTAULIC COUPLINGS

Simple, fast, reliable. *Styles 77, 77-D,* for standard uses with steel or spiral pipe, — *Style 75* for light duty. Other styles for cast iron, plastic and other pipes. Sizes ¾" to 60".

ROUST-A-BOUT COUPLINGS

For plain or beveled end pipe *Style 99.* Simple, quick, and strong. Best engineered and most useful plain end coupling made — takes a real "bull-dog" grip on the pipe. Sizes 2" to 12".

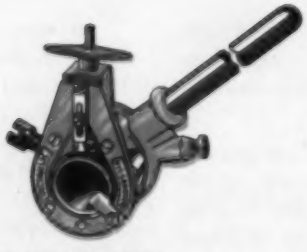
VICTAULIC SNAP-JOINTS

The new, boltless, speed coupling, *Style 78.* Hinged into one assembly for fast piping hook-up or disassembly. Hand locks for savings in time and money. Ideal for portable lines. Sizes 1" to 8".

COUPLINGS FOR EVERY PIPING JOB

VICTAULIC FULL-FLOW FITTINGS

Elbows, Tees, Reducers, Laterals, a *complete line*—fit all Victaulic Couplings. Easily installed — top efficiency. Sizes ¾" to 12".



VIC-GROOVER TOOLS

Time saving, on-the-job grooving tools. Light weight, easy to handle — operate manually or from any power drive. Sizes ¾" to 8".

PLUS FITTINGS AND GROOVING TOOLS

"EASIEST WAY TO MAKE ENDS MEET"

Promptly available from distributor stocks coast to coast.
Write for NEW Victaulic Catalog-Manual No. A-7

VICTAULIC COMPANY OF AMERICA
P. O. BOX 509 • Elizabeth, N. J.

Equipment News *(Continued)*

hauling over the most difficult surfaces. This is accomplished by a hydraulic weight transfer situated between the axles. The tractor's 23-ton weight plus low pressure tires, make it capable of providing more than 19 tons of tractive effort. M-R-S recommends the 200 as a prime mover for self-loading scrapers up to 20 cu yd struck capacity, and for power scrapers up to 30 cu yd.

Design Reduces Breakage

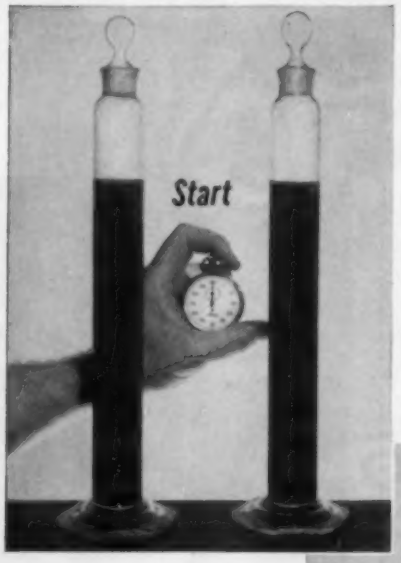
A cutter bit said to be capable of reducing per ton cost by at least 20% in rugged cutting conditions has been announced by General Electric's Metallurgical Products Dept., Detroit, Mich. The bit is the Carboloy CC8. GE says the bit will reduce costs because of less breakage. A negative rake angle and a full nose radius design are the means by which added support and strength have been given the CC8's cutting edge. In addition a newly designed forging permits the bit to operate more freely. Under tests the bit reportedly drew no more amperes than conventional bits being used now.

Industrial Television

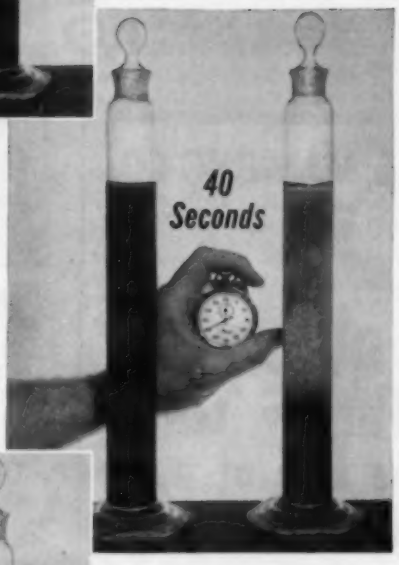
Allen B. Du Mont Laboratories, Inc., 750 Bloomfield Ave., Clifton, N. J., has announced a complete line of industrial television equipment designed to meet the demands of every application from the least expensive to the most elaborate. The company is introducing through distributors a "field

Another new development using

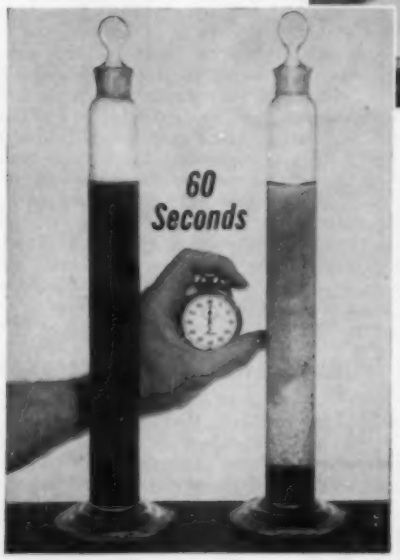
B.F.Goodrich Chemical *raw materials*



Start: Flocculant test in typical coal washery slurries begins with 1.2 parts of Good-rite K-720 per million parts of slurry in graduate at right.



40 Seconds: Control—no change. Graduate with Good-rite K-720 shows settling already well under way.



60 Seconds: Control—no change. Graduate with Good-rite K-720 displays settling virtually complete and sludge in compression.

GOOD-RITE K-720

new flocculant speeds clean-up of coal washery fines

REGARDLESS of the flocculant you are now using, smaller amounts of new Good-rite K-720 flocculating agent can do a faster job of settling coal fines in your thickener. With this higher thickener efficiency, some coal processors can step up effluent discharge rates and increase water recovery volumes to boost coal cleaning capacities. Others can realize cost savings through decreased flocculant requirements.

A range of .016 to .08 pounds of Good-rite K-720 per ton of solids in normal coal processing slurries can effectively settle fines so that overflows contain far less solids than allowed by State anti-pollution laws.

For Service Bulletins on Good-rite flocculants, write Dept. KK-1, B.F.Goodrich Chemical Company, 3135 Euclid Ave., Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

AVAILABLE AS A 20% WATER SOLUTION:

Good-rite K-720 flocculating agent is also supplied at no extra delivered cost as Good-rite K-720S—a 20% water solution which simplifies and minimizes the labor needed for the handling and mixing of dry flocculant prior to addition to slurries.

Good-rite CHEMICALS

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich — GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

They're Interchangeable
They're Simple
They're Quick

Put Economy and Flexibility in your Pipelines

STANDARD and LIGHTWEIGHT
ALUMIRON COUPLINGS
(Made in Aluminum or Malleable Iron)
For Grooved End Pipe

● Think back—remember the effort required to make and complete pipeline joints? Now you can do it an easier way with these two-bolt malleable iron Couplings. Pipeline progress dictated the design of Alumiron Couplings making them the simple, quick, positive, low cost way to join grooved-end steel, aluminum, cast and wrought iron and spiral pipe.

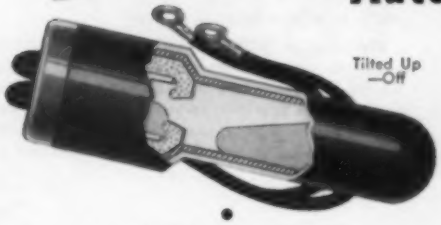
● Alumiron speedily joins grooved-end pipe by the mere tightening of two bolts which run through the coupling halves. The Buna N or oil resistant Neoprene gasket inside the coupling halves firmly and evenly grips the pipe ends making a leak-proof seal which increases as pipeline pressure mounts. This flexible Coupling permits the line to "come and go" with rough and uneven terrain. Component parts are interchangeable with other grooved-end couplings.

● Standard Series to 1,000 PSI working pressure in sizes 1" through 8". Lightweight Series to 500 PSI working pressure in sizes 2", 2½", 3", 4".

Send for literature and prices. Distributor territories open.

CHARLES E. MANNING CO.
4700 CLAIRTON BLVD.
PITTSBURGH 36, PA.

DURAKOOL Tilt Switches are the Life of your Automatic Controls



This steel-clad Durakool mercury tilt switch has unique construction features that deliver years of trouble-free performance on the most difficult assignments you can find. Operating under sealed-in, pressurized hydrogen gas, it takes 24 hours, fast cycling schedules in stride. 7 sizes, 1 to 65 amperes. Send for Bulletin 525.

MILLIONS OF CYCLES WITHOUT FALTERING

See telephone directory for local distributor, or write.
DURAKOOL, INC.
ELKHART, INDIANA, U.S.A.
700 WESTON RD., TORONTO 9, CANADA

Durakool ALL-STEEL MERCURY Switches

Equipment News (*Continued*)

engineered" line of closed circuit television in July. Services will include planning, installation, and servicing. The focal points of the product line will be two models of the videcon camera equipment in two price ranges. Completely installed systems equipped with the TC-100 camera (A) will be available for about $2000. with a TC-200 (B) camera and equipment cost will be approximately $3,500.

High Temperature Safety

A new aluminized asbestos cloth manufactured by Keasbey & Mattison Co., Ambler, Pa., permits workmen to operate safely in areas where temperatures exceed 2,500 deg. The cloth reportedly reflects more than 90% of radiant heat and (photo) permits a workman wearing a "Kamklad" suit to stand directly in front of the open door of an open hearth furnace. In addition to its effectiveness as a heat reflector, says the company, a Kamklad suit will permit a man to walk through a 2,500-deg. propane fire without damage to the suit or discomfort to the man. The cloth is a tightly woven asbestos fabric surfaced with a heat reflective aluminum foil. The smooth foil surface resists water and oils, and flying sparks and cinders fall off its surface without inflicting damage.

Hard Surfacing Electrodes

A line of 14 different hard surfacing electrodes with low hydrogen coatings is being manufactured by the Metal & Thermit Corp., Rahway, N. J. Named Hardex, the electrodes are designed for improved wear resistance and quality hard surfacing. Each of the 14 different types is designed to combat a specific type of wear. The low hydrogen coating feature is said to provide a number of advantages. With less moisture in the coating, weld metal porosity is reduced and less cracking occurs. Testing has

COAL MINING

DIESEL LUBRICATION GUIDE

CITIES SERVICE

WHAT CAUSES LUBRICATION FAILURES?

The biggest single reason for lubrication failure is improper selection and application of lubricants.

Today's lubricating oils are made for highly specialized purposes. The fact that an oil seems ideal for the requirements of one piece of equipment is no guarantee of its qualifications for other machinery.

For example, choice of an oil with low detergency may result in stuck rings, excess cylinder wear, injector clogging, bearing wear and other diesel difficulties.

Next time you're considering what type of oil to use for a certain piece of equipment, call in a Cities Service Lubrication Engineer. He not only has the precise oil for the particular unit you want to lubricate, but may be able to simplify your entire lubrication picture and reduce maintenance costs as well.

USERS ACCLAIM CITIES SERVICE C-300 OIL

From a strip miner comes this report: "Shovel and dragline work 20 hrs. a day, seven days a week. Each have rolled up over 14,000 hrs. with no major overhaul, using Cities Service C-300 Motor Oil."

From a leading stone company: "Our six stationary diesels, powering our compressors and crushers, have averaged 12,000 hours each before major overhaul, with Cities Service C-300 Oil."

From a trucking company: "Our 20 diesels get up to 225,000 miles before overhaul with Cities Service C-300 Oil. We don't even grind the valves before then."

With excellent oxidation resistance, high detergency, and low carbon residue, Cities Service C-300 Oil may be the perfect lubricant for your machinery, too.

Get the facts from a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

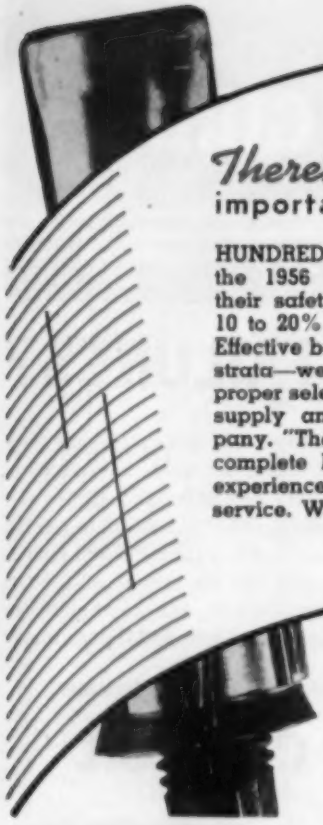
USING A SULPHUROUS FUEL? TRY THIS NEW CITIES SERVICE OIL

If you're using a diesel fuel with high sulphur content, your motor oil must do more than its normal share of work to fight engine deposits.

Cities Service C-100 Motor Oil has been formulated for just this purpose. Under dusty, dirty, and sulphurous conditions, it provides excellent engine lubrication and protection. Talk with your Cities Service Lubrication Engineer for details.

MAN YOU SHOULD KNOW

Barney Fleming is the Regional Manager of Industrial Oil Sales at the Cities Service office in St. Paul, Minnesota. With a background of 35 years as a lubrication engineer and a talent for solving problems, he is typical of the Cities Service engineering staff that's at your service. A call to the nearest Cities Service office will bring a member of this staff to your plant or job site.



There's no question — about the importance of Roof Bolting today.

HUNDREDS of bolted mines—representing 62% of the 1956 underground coal production—improved their safety records and increased production from 10 to 20% per man resulting in lower labor costs. Effective bolting calls for thorough knowledge of roof strata—well planned bolting patterns and cycles—proper selection of bolts and shells with an adequate supply and service program. PATTIN Mfg. Company. "The Pioneer In Roof Bolting" offers the most complete line of quality bolting products with an experienced engineering staff for consultation and service. Write or phone us today.

PATTIN
MFG. COMPANY
Marietta Ohio
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FOR ECONOMICAL COAL DRYING

Your Best Buy Is *Still*

C·M·I

CONTINUOUS CENTRIFUGAL
COAL DRYERS

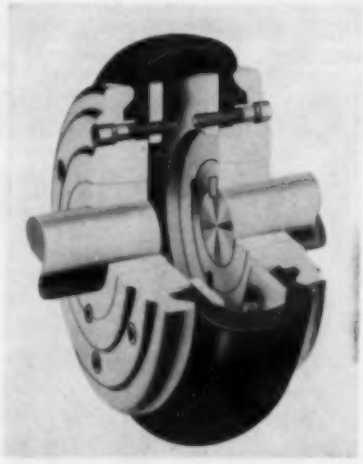
The C.M.I. Dryer has what it takes to get coal dewatered down to 5% moisture and even less. Amazing capacity and performance . . . C.M.I. installations, wherever coal is mined, speak for themselves. Most-profit-producing method of reclaiming marketable coal from slurry. Write for complete details.

C.M.I. Service Anywhere!
Our engineers are available to render prompt service whenever and wherever needed.

C·M·I Centrifugal DRYERS
CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.
146 President St. • St. Louis 18, Missouri

Equipment News (*Continued*)

shown, too, says Metal & Thermit, that penetration into the base metal and dilution by the base metal is at a minimum.



Rubber Tire Coupling

"Paraflex," a new flexible coupling developed by the Dodge Mfg. Corp., Mishawaka, Ind., not only handles angular mis-alignment, parallel misalignment, and end-float, but cushions shock load and diminishes torsional vibration. The reason for all this ability is a tire, which permits four-way flexing from either the drive end or driven end of the coupling. The tire is clamped between two hubs mounted on the shafts to be coupled. The tire, which is made with a transverse split, can be installed without moving the driving or driven machine. "Paraflex," according to Dodge, will permit angular mis-alignment up to 4 deg., parallel mis-alignment up to ⅛ in, and end-float up to 5/16 in—either singly or simultaneously. And, because there is no metal-to-metal contact no lubrication is required, according to the company. The units are made for capacities up to 600 hp at 900 rpm.

Air Tool Line Oilers

A series of line oilers for air tools and rock drills is being manufactured by the Davey Compressor Co., Kent, Ohio. The company says that the oilers will eliminate lubrication troubles, which it asserts are the major cause of tool failures. The oilers are named the Mod-

GENERAL

NYGEN® TIRES

move 465,000 cu. yds. of dirt to meet 120-day deadline date for Berghuis Construction Co.

Stronger than Steel
NYGEN®
... the most indestructible cord ever built into a tire
... exclusive with
GENERAL

Where time is a vital factor, the sure-footed, crawler-like traction and flotation of General Truck Tires can be counted on to get the job done faster and for less.

Built tougher for the toughest jobs with exclusive Nygen Cord construction and featuring extra wide treads for positive traction, Generals are unexcelled for drive, durability and dependability.

Put Nygen-built General Truck Tires to work tomorrow on your toughest job and let them prove their worth in time saved and profits made.

THE GENERAL TRUCK TIRE

specify Generals on your new equipment

THE GENERAL TIRE & RUBBER CO. • Akron, Ohio

els DO-1-2-4 and 8. They have capacities of ½ pt to 2 qt and operate on a "drop-in-pressure" idea. When an air tool throttle is closed, air hose and oiler oil chamber build up to maximum line pressure. When the throttle is opened line pressure in the hose drops slightly and, reducing pressure in the oil chamber, carries oil through the suction tube into the air hose. A needle valve provides control of the amount of oil fed to the tool.

Miniature Radio Unit

"Minitrol," a combination talk-hear-control unit, combines in a single case a microphone, speaker, and controls necessary for station operation of two-way radio systems. Developed by the Radio Corporation of America, the Minitrol measures approximately 6 by 2½ by 2 in, a size much smaller than conventional radio desk equipment, since base station units include a separate base-mounted microphone and a cabinet transmitter-receiver-speaker unit. The small size is made possible by transistors and miniature components. The entire combination can be mounted on an adjustable arm over a dispatcher's desk and can be pre-set for a hands-free operation. A foot switch controls the transmitter.

3-In-1 Metal Worker

A combination shear, punch and coping unit manufactured by Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80, Ill., does all three jobs at high speed. The unit will punch up to $^{13}/_{16}$-in holes in ⅜-in steel plate, and up to $^{11}/_{16}$-in holes in ½-in plate. It shears steel angles, flat bars, round bars, square bars, and steel plate. Notching and coping, too, are part of its work load.

Heavy Duty Block

Sauerman Bros. has introduced a heavy duty rigger-slusher block which is said to be lighter (44 lb) than comparable blocks and practically shatterproof. The block, which is part of the company's Durolite line, is designed to withstand 14-ton dead weight loads without damage. A wide flange permits use of wire rope up to 3/4 in. Sauerman Bros., whose address is 620 So. 28th Ave., Bellwood, Ill., says that a cast bead on the block's housing will keep wire rope within the block groove, even when the block is being worked in a horizontal position. Other features: sealed roller bearings, and infrequent lubrication needs. The block's overall length is 23 in. Diameter is 10.

THERE IS NO WAY you can install a Stamler Car Spotter TO PUT IT IN A "BIND"

This exclusive feature is the basis of the superior STAMLER design!

YOU don't need to be an expert to install a STAMLER Car Spotter. It's a simple job to set up the equipment and get the coal rolling in quick time. *That's because the inherent flexibility of the STAMLER design makes it impossible to twist the machine out of alignment no matter how it is installed!* There is NO WAY you can install a STAMLER Car Spotter to put it in a "bind." This cannot be said of any other car spotter! Think what it means in ease of installation and in ultimate machine life!

It's just another reason why STAMLER equipment gets the coal out faster and more economically . . . why STAMLER equipment operates at the lowest possible maintenance figure!

STAMLER *Hydraulic* CAR SPOTTERS

SCHROEDER BROS., Exclusive Eastern Sales Agent
Pittsburgh, Pennsylvania
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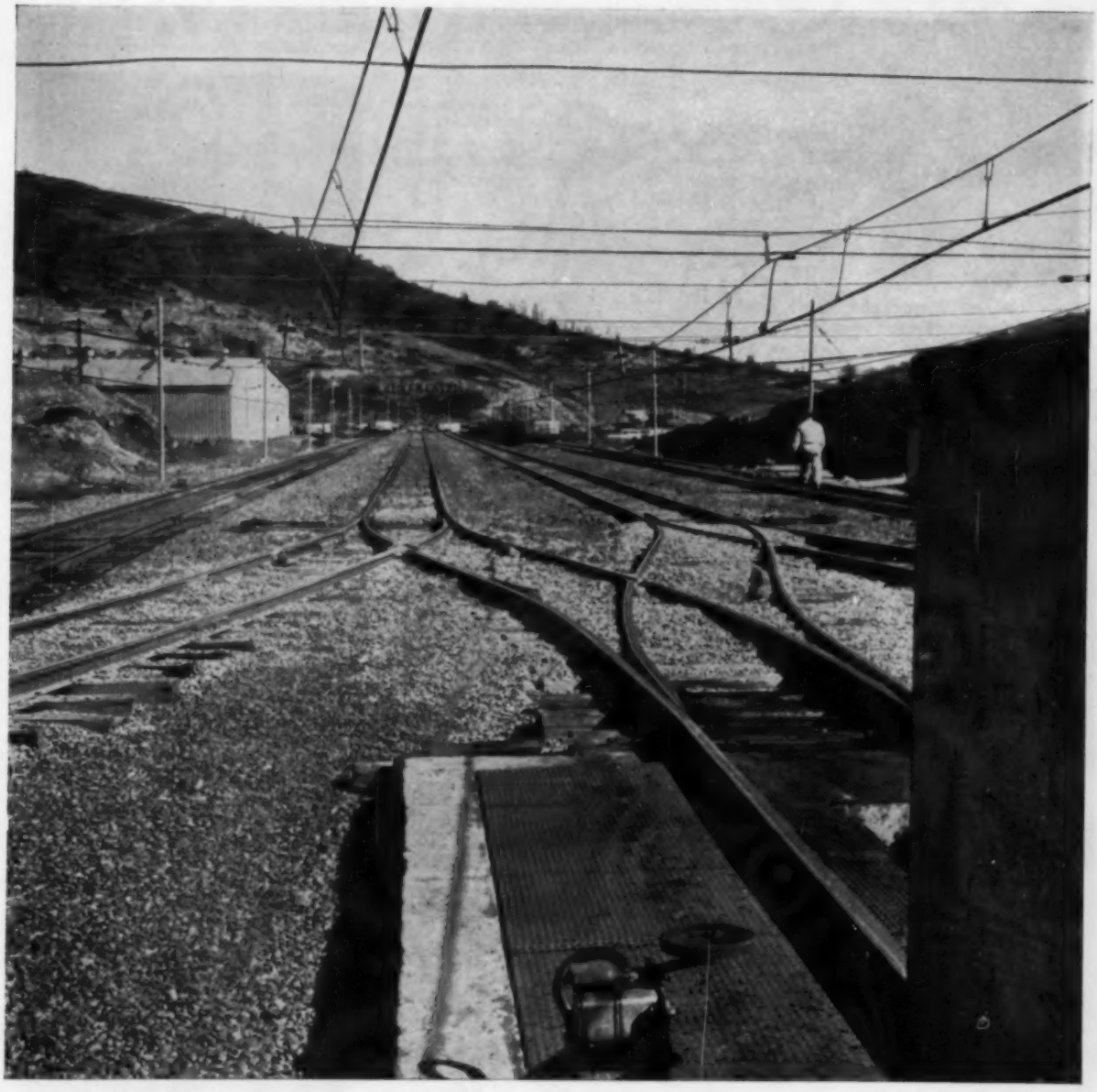
W. R. STAMLER CORPORATION
PARIS, KENTUCKY

SALMON & CO., Birmingham, Alabama
WESTERN SALES ENGINEERING CO.,
Salt Lake City, Utah



Special trackwork that fits to a T

In this new West Virginia yard, coal trips brought up from underground are fed to a rotary dumper in a continuous string, then returned underground almost without pausing for breath.

An ingenious layout design was one of the factors in bringing this marvel of efficiency to reality. Tailor-made special trackwork was another. Bethlehem engineers cooperated with the customer in planning and designing this layout. Bethlehem shops prefabricated the trackwork, including the three diamond turnouts shown in the photograph, and a three-way switch at the discharge end of the dumper. Operations throughout the yard run smoothly as clockwork.

This is a fine example of Bethlehem engineering teamed up with forward-looking mine management to produce money-saving results. If you suspect there may be weak spots in your transportation system, our engineers would like to help you strengthen them. A phone call or note to our nearest sales office will start things moving.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Cable Connectors

A low cost set of connectors (mating male and female plugs) for use with welding cable leads and welding whips is being manufactured by the Joy Mfg. Co. Made in one size only for cable sizes from No 4 through No 4/0 AWG, the connectors are designed with a maximum welding service rating of 550 amp. Features: water-tight Neoprene insulating sleeves; twist-lock connections; low-resistant engagement; and distortion-proof construction. Joy is distributing Bulletin SM-4 on the connectors from its Electrical Products Div., 1201 Macklind Ave., St. Louis 10, Mo.

3-in Wire Rope Sling

A 3-in wire rope sling rated for a safe working load of 72 tons is being manufactured by the Wire Rope Div., American Chain & Cable Co., Wilkes-Barre, Pa. Proof-tested at 144 tons, or

288,000 lb, the sling's actual breaking strength is rated at 720,000 lb. American Chain & Cable furnishes it with the company's patented Dualoc Ending, which eliminates tucking, crushing or distorting the sling body. This, says American Chain & Cable, eliminates a loss of strength in splicing. The Dualoc collars are applied merely to hold the wire ending in position. Full holding power is developed by the wire rope strands of the dead end binding around and against the live end in the wrapped section.

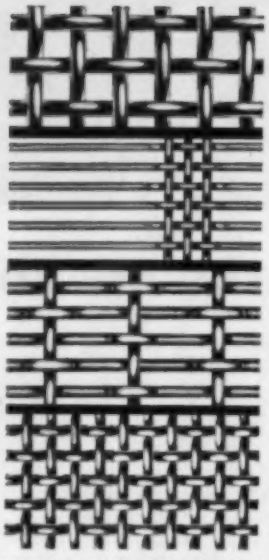
Ludlow-Saylor
Super-Loy
WOVEN WIRE SCREENS

It's a sure-fire tip backed by the experience of thousands of users. L-S Screens wear longer because they're tougher, stronger, more rigid ... screen openings stay accurate indefinitely ... continuous vibration won't cause them to break down.

These and other superior features of L-S Screens guarantee fewer replacements, less downtime, better product uniformity, more production. Job test L-S Screens on your toughest operation and compare their unmatched service and economy.

Immediate Shipment of most weaves and sizes

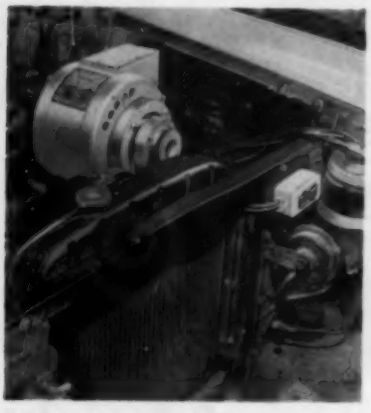
Write For Condensed Screen Reference Catalog



Ludlow-Saylor designs and builds its own looms to produce better wire cloth and screens of stainless, monel, bronze, copper, brass, oil-tempered, high-carbon, or any other wire.

LUDLOW-SAYLOR WIRE CLOTH CO.
609 South Newstead Ave. • St. Louis 10, Mo.

SALES OFFICES: Birmingham, 1727 Sixth Ave., North; Chicago, 5807 W. Diversey; Pittsburgh, Union Trust Building; Houston, 1213 Capitol Ave.; Denver, 1530 Carr St.; WEST COAST: Star Wire Screen and Iron Works, Inc., 2515 San Fernando Road, Los Angeles; Subsidiary, Ludlow-Saylor Wire Cloth Co.



Truck-Mounted Generator

Electric Controls, Inc., Wales, Wis., has introduced a heavy duty electric generator for mounting on trucks and tractors The generator will provide 115-v, single phase AC. It is designed for both continuous portable auxiliary power and for emergency power during service failures. Named the Electrol GenerAC, the generator will operate motors up to 2 hp. The Model CW-3500 (photo) provides 3,500 w of 60-cycle, 115/230 v single phase electric power. The Model CD-1500 provides 1,500 w of power. The GenerAC is driven by an electric clutch, which provides belt drive. The unit is mounted on a bracket that is attached to an engine and connected by belt to the engine's crankshaft pulley. (*Continued*)

Reduce the odor odds ...

Ashland Permatreat Coal Spray Oil — *Lasts the life of the coal!*

- **DUST PROOF—ODORLESS**—Permatreated coal insures dustless deliveries and handling, odorless storage and burning.
- **ELIMINATE WINDAGE LOSS**—that results in lost weight claims and air pollution complaints.
- **CONTROL BULK DENSITY**—Permatreat insures uniform coke production and quality.
- **FREEZE PROOF**—Permatreated coal resists freezing and eliminates frozen car pockets.
- **DECREASE WATER ABSORPTION**—Permatreated coal repels water.
- **REDUCE MOISTURE**—Add 300,000 BTU per ton for each 1% reduction in moisture.
- **MAINTAIN QUALITY**—Permatreat reduces deterioration from weathering.
- **AVOID CORROSION**—Non-corrosive Permatreat can't pit or corrode stoker equipment, or rolling stock.
- **SPECIAL ADVISORY SERVICE**—Available from nationally recognized authorities on coal treating.

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

Ashland PERMATREAT

Equipment News (*Continued*)

Electric Chain Hoist

A lightweight electric chain hoist manufactured by the Wright Hoist Div., American Chain & Cable Co., York, Pa., is designed for use where space is at a premium. The hoist is made in two types of reeving—the 300 to 2,000-lb capacity, single-chain unit and the 3,000 to 4,000-lb capacity, double-chain unit. Operation has been designed for one-hand control. Motors for the hoist are available for operation on standard voltages and frequencies. Lubrication is accomplished with a chain lubricator, which lubricates with a wick automatically.

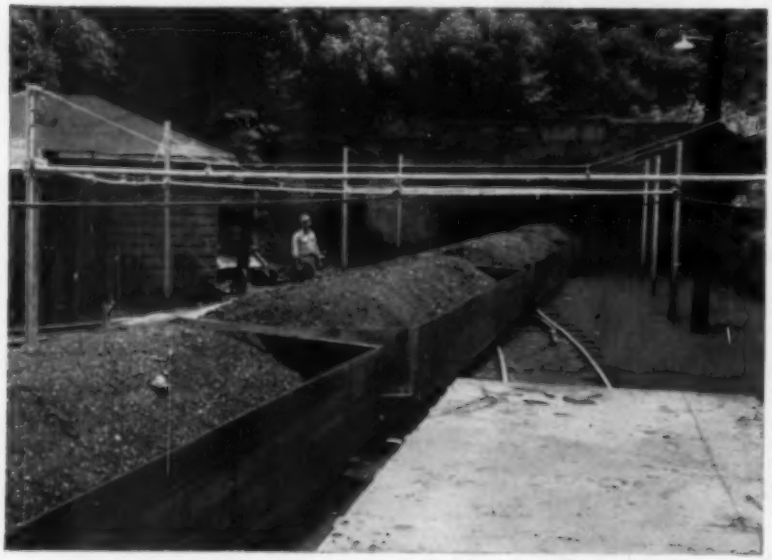
Equipment Shorts

BIT PACKAGING—Carmet, the carbide producing plant of Allegheny Ludlum Steel Corp., is packaging its mining machine bits in a new steel box for easier and faster handling. The box, 11 in long, nearly 6 in wide and 5 in high, is designed for stacking and carrying.

HYDRAULIC DRUM LIFT—Sterling, Fleischman Co., Broomall, Pa., is manufacturing the Model BM3 "High Boy" hydraulic drum lift, which will lift to a maximum height of 72 in. The Hydraulic jack is actuated by a foot pedal. A drum lock permits rotating drums 360 deg. The company says the contents of a drum can be poured easily by use of the lift.

CHEMICAL RESISTANT COATING—E. I. du Pont Co. and the Wilbur & Williams Co. of 130 Lincoln St., Boston 35, Mass., have developed "rubber-coat liquid Hypalon," a brushable or sprayable liquid said to be resistant to almost any type of chemical attack.

FORK TRUCKS—Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich., has introduced the Ranger 150, a pneumatic-tire model fork truck designed for a capacity of 15,000 lb. The unit is equipped with four wheel drive, power steering, power shifting and an oscillating rear axle. It is designed for use on rough terrain.



haulage capacity...

Place Lundale, W. Va.
Operator Amherst Coal Co.
Car Dimensions Length: 24' 6"
Width: 8'
Height: 36" (above rails)
Weight: 9200# empty
Capacity 456 cu. ft. (level load)
536 cu. ft. (crown load)

where can you match it?

Since 1915—
Pioneers in
haulage equipment

DIFFERENTIAL
STEEL CAR COMPANY
FINDLAY, OHIO

Free Bulletins

LOOSE COAL HANDLING—International Harvester is distributing a 20-p catalog which the company describes as a textbook on how to handle loose coal around plants. The publication is entitled "The Money-Saving Way to Stock-Out, Reclaim and Compact Coal." It shows in detail the proper way to prepare an area to support a stockpile and the procedure to follow for profitable and safe stockpiling. An equipment "select-o-graph" helps match units to the haulage requirements of stockpiling and reclaiming. Booklet CR-618-G, Construction Equipment Div., International Harvester Co., 180 No. Michigan Ave., Chicago 1, Ill.

HEAVY MEDIA APPLICATION—Southwestern Engineering Co., 4800 Santa Fe Ave., Los Angeles 58, Cal., has issued Bulletin E56-1R, in which the company describes its heavy media separation plants. The principle of heavy media separation is outlined and its application with "Sweco" built plants. Included are basic application data and a chart on the density relations for magnetic suspension media.

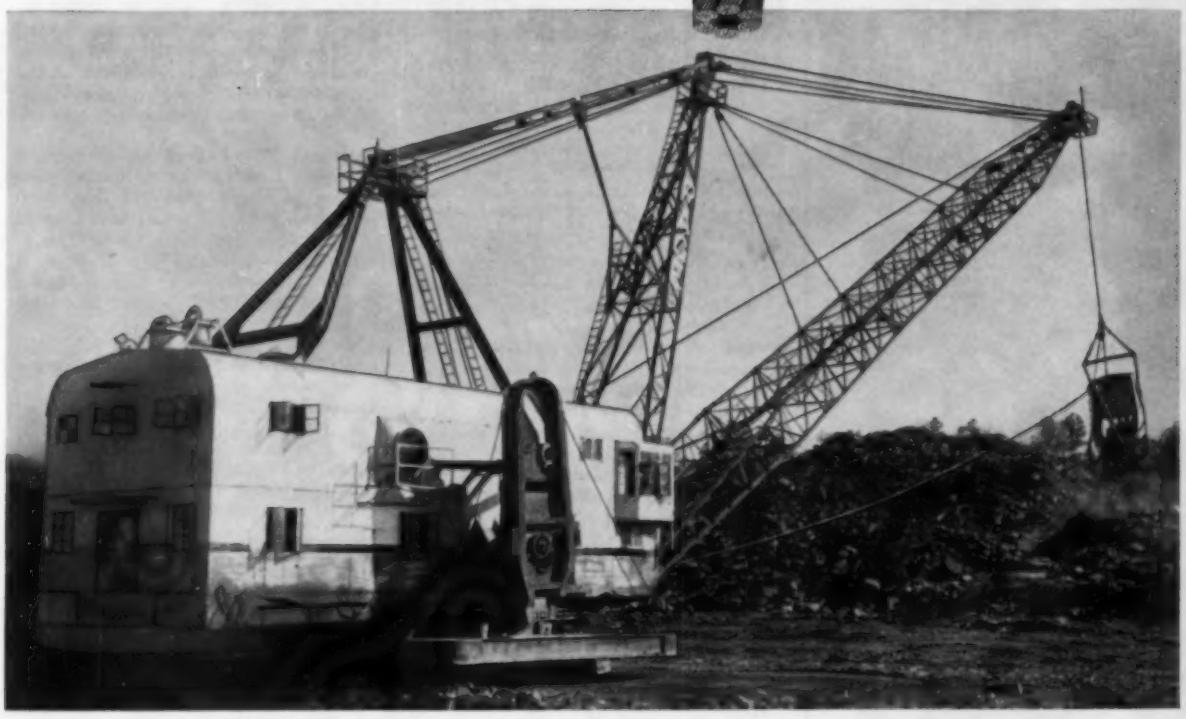
EXPLOSIVES—Facts, figures and descriptions are used by Atlas Powder Co., Explosives Div., Wilmington 99, Del., in "Atlas Explosives Products" to acquaint readers with the company's line of explosives. The 48-p booklet contains specific data for selecting explosives for strip and underground coal. In addition the most effective and economical materials and methods are summarized. More than 150 items are listed.

SHOVELS, DRAGLINES—"More Profitable Coal Mining with Manitowoc," a publication of the Manitowoc Engineering Corp., Manitowoc, Wis., provides details of coal mining operations in which the company's shovels and draglines are used. Engineering features, too, are described. (*Continued*)

ACCO for Better Values

American Cable TRU-LAY VHS WIRE ROPE

15% STRONGER



VHS Dragline Stars in Alabama

Mr. C. A. Lee, Superintendent, Marigold Coals, Inc., Jasper, Alabama, says: "Our Page Model 625 Dragline is used to remove overburden averaging 36 feet of sandrock and blue slate in our strip mining operation. This is rough service. The best Improved Plow Steel Draglines we could formerly buy lasted only from 700 to 750 working hours.

"Now, however, we've switched to new TRU-LAY VHS and we are consistently averaging over 1400 hours. Because of this longer life, we've been able to cut the 'down time' of the dragline for wire rope replacement almost in half—which gives us big savings in increased production and lowered maintenance costs."

See your American Cable Distributor or write to the nearest American Chain & Cable Company Office

Stronger and Safer—New TRU-LAY VHS is made from a new grade of steel for wire rope. It is at least 15% stronger than Improved Plow Steel, the strongest grade formerly available. This means you can now handle heavier loads with the same diameter of line. And you get a higher factor of safety . . . more resistance to shock loads or sudden overstresses.

Tougher, More Wear Resistant—New VHS is tougher, too. It was developed especially for the toughest construction and mining applications—draglines, shovel hoist ropes, scraper and dozer cable. Since it resists abrasion and does not become "hidebound" or lose its flexibility, it lasts longer in these services.

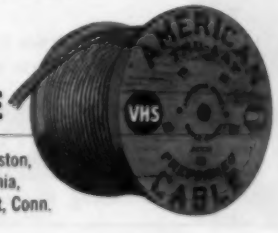
Saves Money—The longer life you get with new TRU-LAY VHS saves you money. And even more important savings are often made through higher production or lowered maintenance costs, since the longer life of VHS reduces the "down time" of important equipment for wire rope replacement

At Your Distributor—Your American Cable distributor has a complete selection of draglines, shovel hoist ropes, slusher ropes and winch lines of new tougher VHS in stock now. You don't need any complicated specifications to order them. Just call him today and tell him the size and diameter you want.

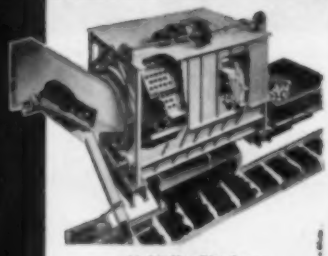
ACCO American Cable Division

AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

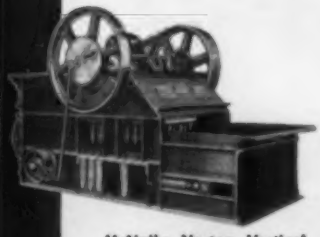


America's most complete line of CRUSHING EQUIPMENT



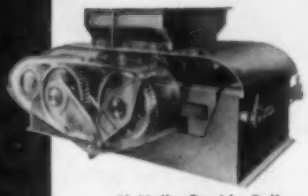
McNally Pittsburg Rotary Breaker

This unit allows positive control of top size in handling run-of-mine washery feed. Production of fines is held to a minimum.



McNally Norton Vertical Pick Breaker

50% Less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic ROM Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating gearmatic drive.

McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages: high volume production, plus accurate sizing, plus low percentage of fines.

McNally Single Roll Crusher

Universal application 20", 24" and 36" diameter rolls.

AVAILABLE

From Stock and on Short Delivery

For immediate action on complete information write, wire, or call.

McNALLY PITTSBURG MFG. CORP.

Pittsburg, Kansas Wellston, Ohio

Equipment News *(Continued)*

MINERS—Two models of the Lee-Norse miner, in addition to the company's "pattern cutting" feature are the subjects of a 6-p brochure recently printed by the company. Schematic drawings of the Model CM33-X for coal seams from 42 in to 80 in and of the Model CM42-X for coal 50 in to 98 in are included. The Lee-Norse miner's cutting principle is also explained. Lee-Norse, Charleroi, Pa.

CAR PULLERS – The Jones Machinery Div., Hewitt-Robins, Inc., Stamford, Conn., has published a 32-p booklet on car pullers. The booklet contains a description of several installations and describes various types of car pullers for moving railroad cars, barges, scrap buggies and many types of industrial transfer cars. Bulletin J-11, 666 Glenbrook Rd., Stamford, Conn.

V-BELTS, HOSE—A survey by field engineers of the Gates Rubber Co. shows how coal mines, washeries and processing plants are getting more profits by cutting unnecessary labor and operating costs, and by reducing downtime. Case histories from operators are included. "How Coal Mines are Cutting Costs with Gates V-Belts, Industrial Hose, Rubber Faced Plate," Gates Rubber Co., Sales Div., Inc., 999 So. Broadway, Denver 17, Colo.

TWO-WAY RADIO – General Electric's newest bulletin on two-way radio, ECR-458, describes the "building block" design of the units, through which components may be interchanged between a station and mobile combinations. G-E Communication Products Dept., Syracuse, N. Y.

FEEDERS – Catalog 571, published by the Simplicity Engineering Co., Durand, Mich., is a rundown on the company's entire line of vibrating Pan-Type "Os-A-Veyor and grizzly feeders. The units are built in capacities up to 1,000 tph, according to the bulletin. Specifications and engineering information on six different models are included.

CONTROL VALVES – Bulletin 571, a publication of C. B. Hunt & Son, Inc., Salem, Ohio, consists of illustrated text on "Quick-As-Wink" air and hydraulic control valves. Included are these types: sliding sleeve, single plunger "O," "B," and high pressure valves.

LUBRICATION –"Breaking Lubrication Barriers" is a 16-p brochure which contains the history and development of the "Molykote" line of molybdenum disulfide lubricants. The brochure is printed by The Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn. The manufacturer considers the brochure a textbook on the technical aspects of molybdenum disulfide as an extreme pressure lubricant.

CEMENT MORTAR—A booklet entitled "Lumnite Cement Mortar Manual—Gun Applied Linings, Masonry" has been published by the Universal Atlas Cement Co., 100 Park Ave., New York 17, N. Y. The booklet contains information on mortar preparation, placing procedure, and general instructions for gun-applied linings.

FEEDERS – McLanahan reciprocating plate feeders are the subject of a 6-p technical bulletin being distributed as No. FRE-57 by McLanahan & Stone Corp., Hollidaysburg, Pa. The feeders, which are designed for feeding controlled quantities of materials, are described with text, charts, and photos.

BELT IDLERS—The complete line of belt conveyor idlers manufactured by C. O. Bartlett & Snow Co., 6200 Harvard Ave., Cleveland 5, Ohio, is described in the company's Bulletin 119. Among the products listed: troughing idlers, flat, self-aligning, rubber disc, and return designs in 4-, 5- and 6-in diameter rolls.

WASTE TREATMENT EQUIPMENT—An easily understood bulletin published by the Chain Belt Co. contains various methods of waste treatment such as screening, grit removal, sludge removal, settling, skimming, flocculation, and flotation. Waste treatment equipment for large and small sewage or industrial plants is covered. Bulletin 315-11, Chain Belt Co., Milwaukee 1, Wis.

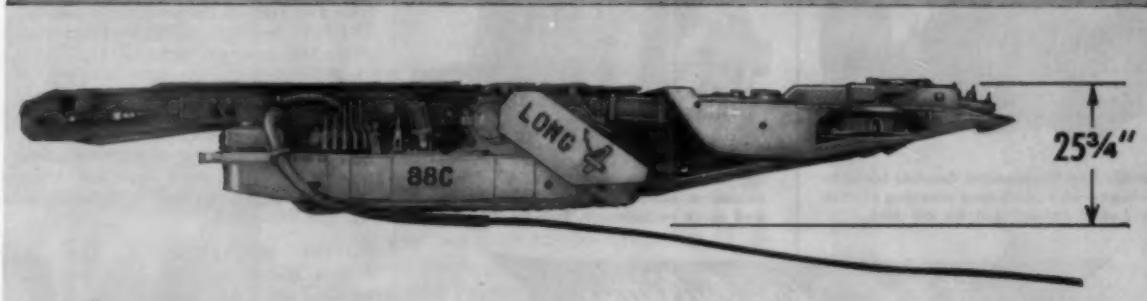
PLASTIC PIPE—The newest technical information on pressure-rated plastic pipe and fittings has been published by Crane Co., 836 So. Michigan Ave., Chicago 5, Ill. The information comes in a 8-p booklet, which contains tables on pressure drop through plastic pipe, pressure temperature ratings for different sizes, and recommended pumping depths. Crane makes three grades of polyethylene pipe – standard wall, 75-lb, and 100-lb.

WATER SUCTION, STEAM HOSE – Two catalog sections on water suction and steam hose have been issued by B. F. Goodrich Industrial Products Co., Akron, Ohio. The water suction hose section consists of data on five types for industrial use. The steam hose section contains data on five types of steam hose plus coupling information.

FITTINGS—The Weatherhead Co., Fort Wayne Div., Fort Wayne, Ind., has catalogued all types of brass fittings and the complete line of drain and shutoff cocks

NEW LONG Model 88-C PIGLOADER

with the lowest operating height of any high-capacity loading machine



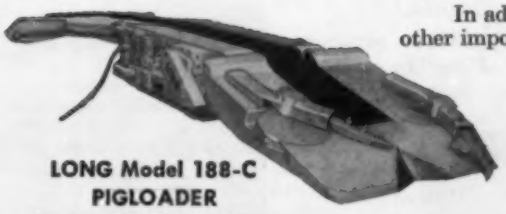
The only loader designed specifically for continuous loading with the Piggyback Conveyor System

Representing the first major innovation in loading machine design in many years, the LONG Pigloader* offers low operating height, straightforward design simplicity, minimum maintenance, high-capacity operation, full independent crawler control, unequalled stability, and unusual digging and tramming power—all vital to handling the high-concentrated tonnages of the Piggyback* Conveyor System of mining.

In this design, a single 40 HP electric motor drives all machine operations. All functions are controlled hydraulically from a single bank of finger-tip control valves. Maximum digging and tramming power is provided as the full 40 HP can be utilized for each operation. Long wheel base and wide tracks give exceptional stability and positive operation even in soft bottom. With the Pigloader's tramming and digging ability, it is able to go to the back of the cut with each pass at the face. Rated capacity is 4 to 6 tons per minute and tramming speed is 95 feet per minute.

In addition to its superior operating features, the Pigloader offers other important advantages. For example—it has fewer, heavier parts, and its simplified design greatly facilitates maintenance.

*Pigloader and Piggyback are trade marks (Reg. U.S. Pat. Off.) of The LONG Company



LONG Model 188-C PIGLOADER For Shuttle Car Loading

The Model 188-C Is Identical to the 88-C, except it is equipped with a swing boom for loading into shuttle cars.

Write for Bulletin No. 4010—or ask for a demonstration.

The LONG Company
Oak Hill, W. Va.

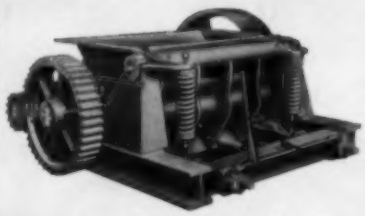
for the MOST DEPENDABLE, MOST ECONOMICAL

COAL CRUSHING EQUIPMENT

Specify

McLANAHAN

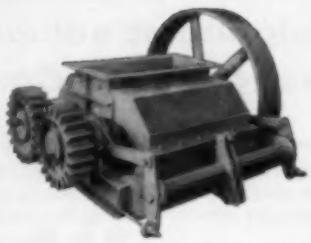
Single Roll Rockmaster Crusher for both primary and secondary crushing of rock and mine refuse. Bulletin RM-505.



Single Roll Black Diamond Crusher with exclusive automatic steelstrut toggle and quick adjustment. Bulletin BD-457.

write today for bulletins

The low cost McLanahan Bantam Buster Single Roll Crusher. Bulletin BB-5112.



McLanahan Black Diamond Double Roll Crusher for various reductions of medium-size feeds. Bulletin BDDR-255 (for coal) and DR-155 (for rock).

Backed by 120 years of manufacturing experience, McLanahan builds crushing equipment for the ultimate in economy through long service and minimum maintenance costs. This equipment, which has been thoroughly service-proven on the most demanding of domestic and foreign installations, is available in a variety of sizes for every coal crushing requirement. McLanahan is equipped to produce complete units, from feeders, primary and reduction crushers through elevators, sizing screens, etc.

McLANAHAN AND STONE CORPORATION

McLANAHAN

230 Wall Street, Hollidaysburg, Pa.

Manufacturers — Founders — Machinists

Sales Offices in Principal Cities of the United States

Pit, Mine and Quarry Equipment Headquarters Since 1835

Equipment News (*Continued*)

in "Brass Tube Fittings." Also covered are push-pull controls, assembly instructions, and tube fitting data.

METHANE DETECTOR – Bulletin 0809-4, published by Mine Safety Appliances Co., 201 No. Braddock Ave., Pittsburgh 8, Pa., describes the portable M-S-A Type W-8 methane detector manufactured by the company. The instrument's sensitivity and its operation are described in detail.

TRANSMISSION EQUIPMENT – Clark Equipment Co.'s line of power transmission equipment is the subject of a 12-p booklet entitled "Power Transmission Equipment." Included are synchronized transmissions, the StepMatic transmission, TransVerters and torque converters.

FLEXIBLE HOSE – The metal flexible hose manufactured by the Universal Metal Hose Co., 2133 South Kedzie Ave., Chicago 23, Ill., is listed according to styles and sizes in the company's catalog 1D-100A. Seamless, corrugated type and interlocked type are included.

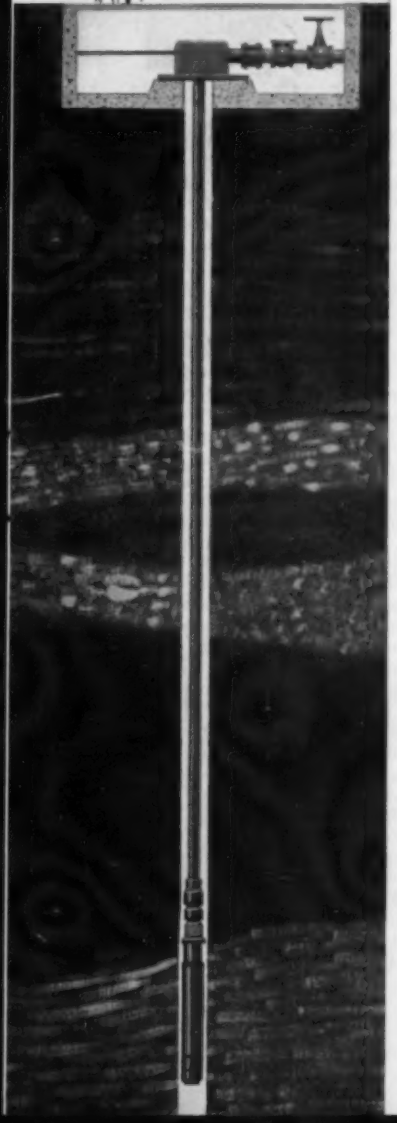
INDUSTRIAL ENGINES—Fageol Products Div., Twin Coach Co., 850 W. Main St., Kent, Ohio, in Catalog LL-4880, tells how its Fageol 44 engine provides more power pound-for-pound than any other industrial engine. Various models of the "44" are illustrated.

MOTOR MAINTENANCE—"How to Make a Motor Go . . . and Go, and Go, and Go," and "How to Take Step Seven" are two bulletins (51X8581 and 51X8582) which use the story of two maintenance men, one efficient the other inefficient, to bring home the necessity for maintaining a motor properly. Bulletin 51X8581 points out that looking, feeling, and listening are all good methods for determining the daily condition of a motor. Bulletin 51X8582 points out a number of checkout needs. Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis.

SPRAY NOZZLES—Concenco spray nozzles manufactured by the Deister Concentrator Co., Fort Wayne, Ind., are the subject of a new folder being distributed by the company. The folder lists advantages and includes graphic charts for each type of nozzle made by the company. Included is information on the characteristics of the discharged sheet spray obtained with different nozzle orifices under various pressures. Address: 903 Glasgow Ave., Fort Wayne.

SCREENS—Dorr-Oliver Inc. is distributing a new bulletin describing the Dorr-Oliver DSM screen. The bulletin is No. 2300 and is being distributed from the company's office at Barry Place, Stamford, Conn. Contained in the bulletin are data on the screen's design, operation and reported advantages for wet screening non-fibrous slurry feeds. The screen is designed to provide controlled and predictable screening in the 8- to 48-mesh range. Its parts consist essentially of a concave, wedge bar in a stationary housing.

Now you can bury your pumping problems



FAIRBANKS-MORSE
Water-Lubricated Submersible Pump

Now you can have all the advantages of a submersible pump, plus time- and performance-tested Fairbanks-Morse features.

Fairbanks-Morse submersible pumps permit well location anywhere that a well can be drilled. No unsightly installations, no costly pump housing. Nothing—absolutely nothing—need show above ground. These pumps submerged in the well below water level are practically soundless and require no line shafts, packing boxes or lubrication devices. Hence, wearing parts needing maintenance are reduced to a minimum. A single moving assembly does all the work.

Installation is faster and more economical. The Fairbanks-Morse motor, with lifetime Copperspun rotor cooled by water and lubricated by water, gives full motor output. The well-known Fairbanks-Morse or Pomona pump bowls are combined with these wet stator motors to produce unbeatable pumping units covering a wide range of requirements as to volume, pressure, and setting depth.

For industry or community service you can place your water service trust in the F-M submersible. Contact your Fairbanks-Morse Sales Engineer and ask him for Bulletin 6910 on this time-proved submersible pump, or write today to Fairbanks, Morse & Co., Dept. CA-7, 600 S. Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

PUMPS • SCALES • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY
RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

NEWS ROUND-UP

Atom Power Clamor Said To Ignore Reality

An Atomic Energy Commission official attempted publicly last month to puncture a ballooning notion that abundant nuclear power was just around the corner. The official was W. Kenneth Davis, director of the AEC's reactor development division.

Speaking in Harriman, N. Y., during the press-covered 8th Annual Conference on Industrial Research, Mr. Davis said that economic atomic power is at least 10 to 20 yr away in the United States and probably never will "supply more than a relatively small portion of our future energy requirements."

"Many people," Mr. Davis said, "are now convinced that the large-scale use of nuclear power which will solve all of our energy problems is just around the corner and that if someone could just straighten out those 'bumbling bureaucrats' in Washington the whole thing would be solved."

Not so, the atomic expert concluded, since nuclear power for the United States is only "in the early stages of research and development."

On the same day (June 3) in Chicago another expert, former general manager of the AEC Kenneth D. Nichols, was echoing the Davis theme before delegates to the Edison Electric Institute's 25th annual convention. Declaring that public clamor for atomic power ignored economic realities, Mr. Nichols charged that "the strength of demand comes from those who would like to promote a public power program—and also from those who feel that we must maintain our leadership (internationally) for prestige purposes."

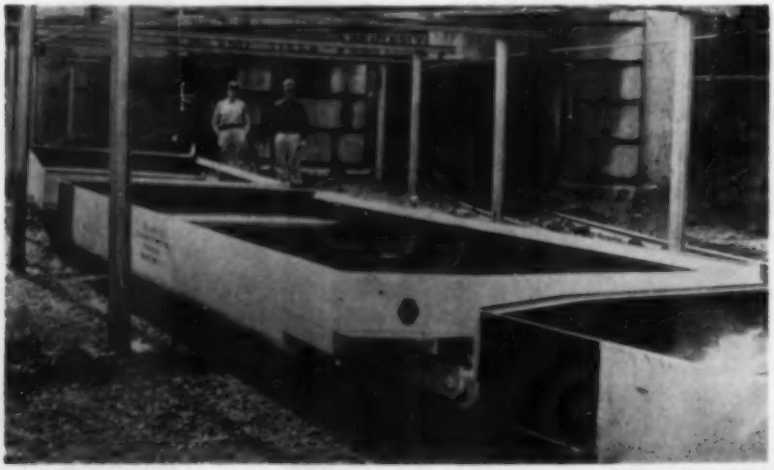
He asserted that atomic power did not hold immediate prospects for competing in areas where good fossil fuel (coal or oil) was readily available. The rush to develop atomic power should not be made in areas "blessed with cheap power."

Meanwhile at the same convention, the Edison Electric Institute's president, Donald S. Kennedy, was saying that 80 investor-owned electric companies, were participating in 14 nuclear projects of various kinds, compared with 44 companies participating in nine projects in 1956. Mr. Kennedy added: "The time, technical manpower and funds being devoted to nuclear energy programs of electric power companies" are evidence of the industry's determination to try to develop commercial utilization of nuclear power.

Thus, as the mid-year point of 1956 approached and passed the prospect of nuclear energy usurping the place of fossil fuels to produce power seemed remote, even to the power makers themselves. At the same time, however, a number of them were more than marking nuclear time so it wouldn't pass them by.

In This Section

Atom Clamor Ignors Reality	136
Gas Bill Hits Snags	136
Freight Rates Going Up	138
88 Cited for Safety	138
No Residual Controls Sighted	142
News Briefs	142
Current Coal Patents	153
Europe's Record Holder	156
Personal Notes	164
Among the Manufacturers	170



STEEL PRODUCTION MILESTONE—When Inland Steel Co. approached the 100 million-ton steel making mark recently company officials began tracking, then guiding the significant ton to commemorate the occasion. The result of the tracking and guiding was the mine car above, which was built by the Differential Steel Car Co., Findlay, Ohio. The car, fittingly engraved, is in service now at Inland's coal mine in Wheelright, Ky. To get some meaningful impact into relatively impactless figures Inland's public relations office estimated that 100 million tons of steel are enough to build a single track railroad to the moon with enough track left over to girdle the globe.

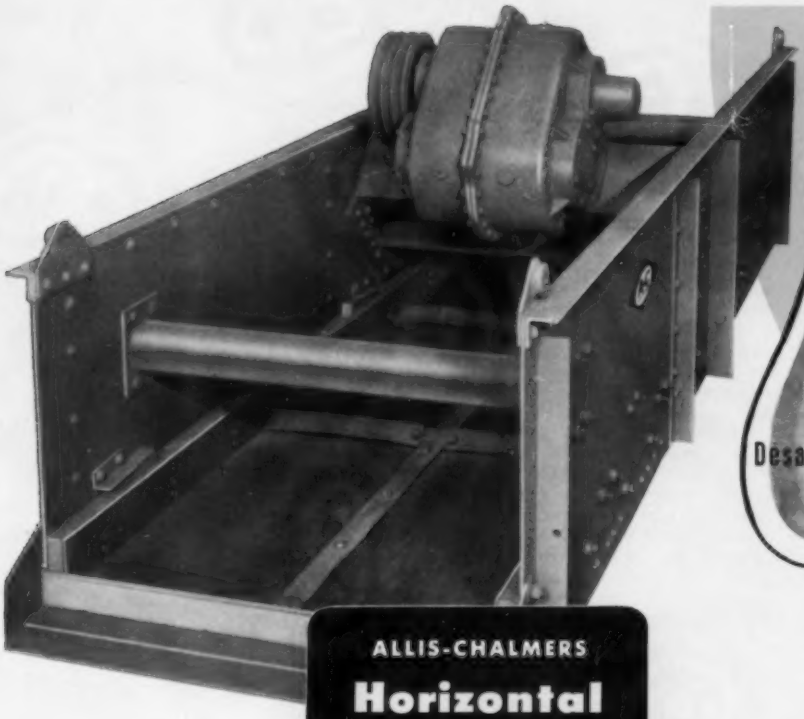
Gas Bill Passage Doubted As Snags Waylay It

The Harris-O'Hara natural gas bill, which would ease controls the Federal Power Commision has over natural gas producers, was groping its way through the Congressional legislative process—House hearings and committees—as June closed.

In the capitol McGraw-Hill's Washington bureau reported that "the bill cannot possibly pass this year, and it's still exceedingly doubtful it can pass next year," since legislation introduced in the current session will still be before Congress next session.

The blow-by-blow of the bill's troubled passage began in May with the start of House hearings. By June it was pending before the House Interstate Commerce Committee. From the committee, where the question of its release became the subject of rife speculation on all sides, the bill was scheduled to move through the House Rules Committee, which clears all legislation to the full House for debate and vote. The job to clear the House, itself, seemed to be a difficult one, too, since the House passed in 1955 the Harris-Fulbright bill, a similar measure, by a vote of only 209 to 203. (President Eisenhower vetoed the Harris-Fulbright measure later because of "arrogant" lobbying tactics.)

Meanwhile, the chairman of the Senate Commerce Committee has announced that his committee will not take up the gas bill before next January at best. That announcement automatically throws the issue over into an election year. Actual passage through the



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Horizontal SCREENS

The OVERWHELMING CHOICE for the Rough-Tough Job of

Coal Dewatering

IN any preparation plant you're almost sure to see Allis-Chalmers screens on *all* the tough dewatering jobs. Why this marked preference? The most important reason is that the coal industry itself has had a constant influence on the development of this outstanding performer. *Throughout the past quarter century,* the cooperation of plant operators has enabled Allis-Chalmers to design and build the sturdy, efficient screen needed for dewatering operations.

Help for Tipple Manufacturers

Close contact with the coal industry has also given Allis-Chalmers a vast volume of application information. This invaluable data on capacities, surface moistures and other variables is available to tipple manufacturers and operators—for determining flow sheets and the selection of heat driers, centrifuges, etc.

Solids Recovery

Allis-Chalmers vibrating screens are widely used to close circuit a plant in conjunction with cyclones and/or thickeners for recovery of solids, fine coal and refuse, and to prevent stream pollution.

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Senate, however, is believed possible if the bill gets through the House.

The coal industry's position regarding the bill was to push for an amendment to outlaw so-called "dump sales" of natural gas, i.e. direct sales by the interstate pipelines to industrial customers at a price much lower than to other customers.

The National Coal Association, in its contact with the proposed gas measure agreed that gas producers should be freed from Federal Power Commission regulation at the well head. But the NCA voiced a fear that homeowners will bear an "unfair proportion of maintaining a high profit position" for natural gas companies while industrial users are served at below-cost prices. Robert E. Lee Hall, NCA general counsel, who testified before the House Interstate and Foreign Commerce Committee, disclosed the NCA views and called for revision of the Natural Gas Act to cover direct industrial sales and prohibit below-cost sales to industrial consumers.

But, the right of natural gas pipelines to make "below cost" sales to industrial consumers has new court backing. The National Coal Association has challenged the Federal Power Commission's action in authorizing Northern Natural Gas Co. to sell gas for use under boilers at a Northern State Power Co. generating plant near Minneapolis.

NCA claimed such industrial "dump" sales should be prohibited as wasteful use of a precious resource. However, the U. S. Court of Appeals for the District of Columbia upheld the proposed sales on grounds it will lower the pipeline's unit costs—and benefit power consumers.

Freight Rate Boosts Expected By Mid-Summer

Coal shippers can expect railroad freight rates to jump beginning around mid-summer.

As freight rate hearings before the Interstate Commerce Commission ended last month and July began there was no doubt that an increase would be granted.

The only issues in doubt were 1) when the ICC would announce its decision and 2) how much of a boost it would permit.

In Washington observers were expecting a decision "not before the first week of July," but before August, since August is traditionally a vacation month.

To carry the nation's coal the railroads were asking for a 15c a ton hike. Granted a 10c boost on coal rates in an interim increase last winter, they were seeking to add another 5c, which, observers guessed, they would get.

Export coal, increased by 5c a ton at the time of the interim boost, may be raised, too, but how much was difficult to say.

The move to the Interstate Commerce Commission with a statistical tale of soaring costs and plummeting revenues was begun by the railroads last fall. Asking for a 15% rise in freight rates, they said the need was immediate. Labor costs were up, equipment costs were up, revenue was down. Railroads, the railroads argued later, had been getting along on a 4% capital investment return and were entitled to 6%.

In fact, in a plea last month before the ICC, Edward A. Kaier, a representative of the Pennsylvania RR, said that a 6% investment earnings level has long been recognized as reasonable for other public utilities. "The issue now before you," argued Mr. Kaier, "is whether the railroads are to continue to live on the brink of actual financial distress, or whether the commission will recognize their legal and economic right to a decent standard of living."

But from Virginia and one of the opposition came a denial that a financial brink was facing railroad and that they were not living on a decent standard—at least not in Virginia.

The Virginia State Corporation Commission, in a brief filed with the ICC, asserted that in Virginia most of the railroads, particularly those hauling coal, earned more than 6% last year.

Generally, the railroads seek total increases of 15% (southern roads) and 22% (eastern and western roads).

Last fall when they asked for a 15% raise the ICC responded with a 7% emergency, or interim, increase.

Eastern and western lines immediately added the interim boost to their original request, to make a total increase sought by them of 22%, 15% for southern roads.

Bituminous Output

YEAR TO DATE	PRODUCTION
June 15, 1957	232,010,000
June 16, 1956	236,563,000

1957 output 1.9% behind 1956.
A month earlier output was 2.4% behind 1956.

WEEK ENDING	PRODUCTION
June 15, 1957	10,300,000
June 16, 1956	10,122,000

Anthracite Output

YEAR TO DATE	PRODUCTION
June 15, 1957	12,118,000
June 16, 1956	12,408,000

1957 output 2.3% behind 1956.
A month earlier 1957 output was 6.3% behind 1956.

WEEK ENDING	PRODUCTION
June 15, 1957	612,000
June 16, 1956	538,000

88 Supervisors Awarded Safety Citations

Eighty-eight mine supervisors representing five coal mining companies in eastern Kentucky were presented with safety awards during the first annual awards dinner of the Big Sandy-Elkhorn Coal Mining Institute.

The safety records of the supervisors ranged from 1 to 12 yr without a disabling injury occurring among men under their supervision.

The companies the men represented were members of the institute, which recorded no fatalities among all its member mines during the first 4 mo of 1957. The institute in its 20-yr history has not equaled that safety mark.

Prior to the awards ceremony B. F. Reed, secretary-treasurer of the Turner-Elkhorn Mining Co., Drift, Ky., attributed the current national output decline to "some letup in demand for metallurgical coal". He pointed out that steel production was less than it was a year ago.

The supervisors receiving the safety awards were:

One Year—Henry Bowers, Jr., Lewis Grigsby, Ray Wiley, Jr., O. E. Drake, Ray Jackson, Luther Sexton, L. C. Russell, Homer Richardson, Cecil Ditty,

Preparation Facilities

Harlan Collieries Co., Brookside, Ky.—Contract closed with the Daniels Co., Contractors, Inc., for a DMS dense media precision coal washer to produce coal at a rate up to 200 tph. Completion date, 3rd quarter, 1957.

Pocahontas Fuel Co., Jenkinjones mine, Jenkinjones, W. Va.—Contract closed with the Deister Concentrator Co. for three Concenco "77" diagonal deck washing tables.

Pocahontas Fuel Co., Itmann, W. Va.—Contract closed with the Deister Concentrator Co. for two Concenco "77" coal washing tables.

Peerless Coal & Coke Co., Vivian, W. Va.— Contract closed with the Deister Concentrator Co. for one Concenco "77" coal washing table.

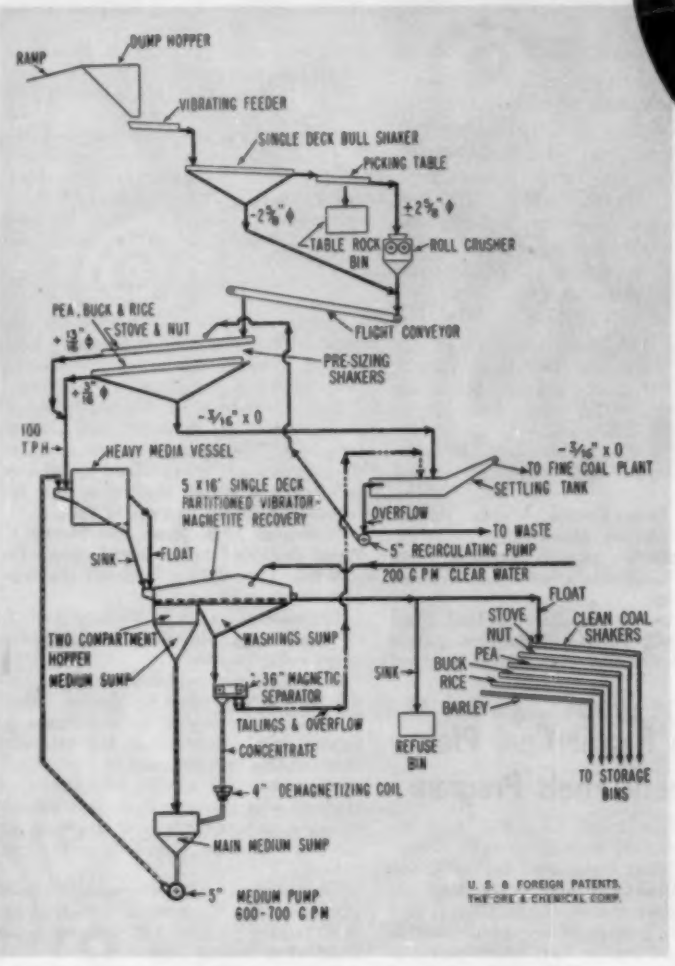
Island Creek Coal Co., Mine 17, Red Jacket, W. Va.—Contract closed with the Deister Concentrator Co. for four Concenco "77" diagonal deck coal washing tables.

Sheridan Washery, Tower City, Pa.—Contract closed with the Deister Concentrator Co. for one Model 109 Concenco revolving feed distributor for five-way feed.

Bolt Mining Co., Bolt, W. Va.—Contract closed with the Daniels Co., Contractors, Inc., for a complete preparation plant to produce analysis coal from the Eagle A and B seams. Completion date, November, 1957.

IMPROVES COMPETITIVE POSITION WITH 'WILMOT-OCC' HM VESSEL

ELIMINATING MULTIPLE CLEANERS SIMPLIFIES PLANT CIRCUITS



Flow chart suggests plant simplification achieved by Live Oak's installation of a single Wilmot-OCC heavy-media vessel, pictured at top.

Live Oak Coal Co. Feeds a Wide Range of Sizes to a Single Heavy-Media Vessel

The flow chart at left offers a graphic example of how Wilmot-OCC heavy-media vessels are cutting production costs. Note how Live Oak Coal Co., by installing one vessel, eliminated several cleaners, numerous conveyors, screens and other equipment. In addition to savings in both operating and maintenance labor, the company effected substantial improvements in yield and product quality. Their vessel's performance figures show less than 1% of misplaced material and a loss of less than ¼ lb. of magnetite per ton of raw coal. The owners of Live Oak feel that their modernization program has clearly achieved the desired goal:- To insure their place in the market.

SEND FOR BULLETIN and reprint of the Live Oak story in a leading mining magazine.

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SAFETY AWARD WINNERS—C. H. Brown (left), president of the Big Sandy-Elkhorn Coal Mining Institute, presents safety certificates in Pikeville, Ky., to two of the three mine supervisors receiving 12-yr awards at the institute's first annual awards dinner. Holding certificates are W. A. Pack, Inland Steel Co., Wheelwright, Ky., and N. L. Akers, No. 22 mine, Bethlehem Mines Corp., Jenkins, Ky. Between Mr. Pack and Mr. Akers are R. C. Collier (left), first vice president of the institute, and B. F. Reed, secretary-treasurer of the Turner-Elkhorn Coal Mining Co., Drift, Ky. and principal speaker at the awards dinner. Mr. Brown is connected with the Republic Steel Corp., Elkhorn City, Ky.; Mr. Collier is associated with Bethlehem Mines Corp.

Damon Chaffins, Island Creek Coal Co.; Paul Preston, Inland Steel Co.; Otis Bussey, Eugene Wells, Paul V. Fitch, Woodrow Chaffins, Princess Elkhorn Coal Co.; Ivory Conley, Henry Horner, Dewey Looney, Elmer Conatser, Bethlehem Mines Corp.; R. E. Bartley, Republic Steel Corp.

Two Years—George Laxton, Sam Gayhart, Ballard Fleming, Boyd Bartram, Bascom DeRossett, John W. Rush, Stilson Conley, Island Creek Coal Co.; Edgar Sherman, James E. Conley, Clyde Little, Inland Steel Co.; Clyde Bracy, Ted Simpkins, Republic Steel Corp.; Fritz Nelson, Ralph Perry, Glen H. Berry, John F. Huffman, Bethlehem Mines Corp.

Three Years—Guy Baker, Inland Steel Co.; W. C. Price, Princess Elkhorn Coal Co.; Ersel Ratliff, Landon Slone, T. J. Davis, Republic Steel Corp.; Millard Preston, Bethlehem Mines Corp.; Ray Wiley, Sr., Emery Bartram, Mitchel Watson, Island Creek Coal Co.

Four Years—Clayton C. Dickerson, Clarence Carter, Elmer Ferguson, Inland Steel Co.; J. E. Collins, Rufus McKee, Republic Steel Corp.; Rex T. Martin, Bethlehem Mines Corp.

Five Years—Virgil Blevins, Elzie Yates, Delbert Davis, Howard Ferguson, James K. Daniel, Worley Mace, Inland Steel Co; Charles J. Daniels, Princess Elkhorn Coal Co.; Henry Sparks, Ted Pass, James T. Johnson, Frank Howard, Bethlehem Mines Corp.; A. O. Elkins, Republic Steel Corp.

Six Years—Raymond Ratliff, Republic Steel Corp.; LeRoy Spears, Oliver Marshall, Princess Elkhorn Coal Co.; Robert England, Carl Johnson, John W. Helton, Inland Steel Co.; H. C. Hollyfield, Cletis Howell, Ed Boggs, Hershel Childers, Estill Cox, Bethlehem Mines Corp.

Seven Years—Jeff Hollyfield, Denver Plummer, Warnie Flint Jr., Bethlehem Mines Corp.; W. W. Moore, Elihu Coyer, Republic Steel Corp.

Eight Years—Joe Burgess, Republic Steel Corp.; Frank Childers, Inland Steel Co.

Nine Years—Drexel Webb, Palmer Scott, Bethlehem Mines Corp.

10 Years—Guy Ratliff, Republic Steel Corp.; Henry Skeen Sewell, Bethlehem Mines Corp.

12 Years—W. A. Pack, Inland Steel Co.; N. L. Akers, Bethlehem Mines Corp.; Byron Coleman, Republic Steel Co.

Union Pacific Coal Plans Synthetic Fuels Program

Preliminary plans for a $50- to $150-million synthetic fuels program in Wyoming are being formulated by the Union Pacific Coal Co. and other interests. But, whether the plans can be executed hinges on passage of an amendment to the mineral leasing law, which prohibits railroads from mining coal for any use except burning it in their locomotives. The amendment, which was introduced in Congress June 14, is sponsored by Sen. Frank Barrett (R-Wyo). Sen. Barrett says the Union Pacific Co. hopes to get the first portion of its plant under construction within 18 to 24 mo. The exact location was not disclosed, but the company plans to extract synthetic fuels and chemicals from the coal it mines in its deposits at Rock Springs and Hanna.

Union Pacific Coal Co. would also expand its present coal operations and mine coal on adjacent government lands. Sen. Barrett says the the company has been studying the feasibility of synthetic fuel extraction for 5 yr.

Under the proposed plan synthetic fuel would be used in locomotives and other operations. Char left after extraction would be used in generating electric power for Union Pacific's contemplated iron ore mining operations at Iron Mountain, northwest of Cheyenne.

NCA Education Committee Meets At VPI

Coal's place among other industries and its place among the career attitudes of students were among the chief topics discussed by the National Coal Association's Vocational Training & Education Committee and Virginia Polytechnic Institute's officers and faculty recently at VPI. In an exchange of ideas, opinions, and facts committee members and the VPI staff discussed starting salaries, coal sales courses, mining engineering courses, engineering enrollment, the need for coal scholarships, low enrollments, student attitudes toward mining students, and coal's public relations.

In a faculty report to the NCA committee Dr. W. H. Cato, director of guidance and placement, gave an account of the activities of his office concerning industrial interviews and starting rates of pay for graduate.

Professor John Cain discussed cooperative engineering programs, referring to companies that were giving employment to some students who worked in industry half the year, then studied at the Institute during the remaining half.

Professors J. B. Jones and Henry L. Wood described an advanced course for coal salesmen, listing in detail the type of instruction given.

Professors Charles T. Holland and T. C. Shelton, Jr., described VPI's mining engineering courses.

In a later meeting and executive session of the committee, chairman Henry C. Woods commented on enrollment in engineering; education as big business; deterioration in instruction in high school mathematics and science; the failure of students who graduate from high schools to move on to college; and the need for more scholarships, especially in the coal industry.

During the session Professor Holland disclosed that there were 200 students from mining areas at VPI who were not enrolled in mining engineering.

L. Newton Thomas, president of the NCA, commented that other engineering students "look down" upon those who are studying mining .He said he regarded the situation as a challenge to the industry to promote interest among high school students. Concurring in the suggestion for more promotion work among high school students, Tom Pickett, executive vice president of the NCA, declared that students needed an accurate understanding of the coal mining industry. He suggested that a sub-committee of five men

OVER 20 YEARS OLD . . . yet Bearings, Inc. delivered replacement bearings for these back axles from stock

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PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
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be appointed to analyze the high school situation.

Roland C. Luther, in a discussion about vocational training, asked what is being done for students who wished to study mining but did not have the means.

Professor Holland pointed out that officials at mines generally do not encourage students to study and prepare themselves for working in the coal industry. He also pointed out that mothers are afraid to have their sons work in the mines. In addition, Professor Holland said, living conditions were not as good as they should be in some localities. He recommended that publicity be given to areas with improved conditions.

Attending NCA committee members were Henry C. Woods, chairman; L. I. Cothern; George R. Leatherman; Roland C. Luther; C. R. Nailer; V. D. Picklesimer; James D. Reilly; John J. Snure; Charles F. Spender; and Harry C. Walter.

Also present were L. Newton Thomas, president of NCA; Tom Pickett, executive vice president; Dr. M. Edmund Speare, education director; and M. D. Cooper, director of mining engineering education.

The committee will meet next at Ohio State University in October.

No Controls Expected On Residual Oil Imports

The Eisenhower administration, which is under increasing pressure to hold down oil imports, shows little indication that any restrictions will be applied to residual fuel oil imports along with crude oil imports.

To date Defense Mobilizer Gordon Gray, acting under the provisions of the Reciprocal Trade Agreements Act, has informed President Eisenhower that crude oil imports may be endangering national security.

The President responded by ordering a study to determine whether mobilizer Gray's concern was justified.

Meanwhile, the President has requested Mr. Gray to make another try at a voluntary solution of the problem.

However, neither has mentioned residual oil imports—a fact that has been strongly condemned by the National Coal Association and other coal industry groups.

Government policy makers appear convinced that residual imports are in a different category than crude and should not be restricted unless they go much higher than they are at present.

In crude, hopes for a voluntary solution are fading. The administration is believed to be close to imposing some kind of restrictions on crude imports, but tight restraints are unlikely.

As a result coal industry spokesmen are ready to "raise the roof" in Congress if no action is taken against residual oil importing. Tom Pickett, executive vice president of the NCA, says that the organization will seek tough new legislation restricting imports unless something is done.

News Briefs

Railroads were authorized by the Interstate Commerce Commission to increase demurrage charges.

Under the authorization shippers, who are permitted two days for loading and unloading, will be charged $4 a day for the first four days following the free two-day unloading period. After that the daily demurrage rate will move to $8. The authorization, which requires railroads to serve a 30-day notice of increased rates, is a compromise. Rails had asked to charge $4 a day for the first two days following so-called free time, $7 for the next two days and $10 for each day after that. Current rates are $3 for the first four days after free time and $6 beginning on the fifth day. In its decision to grant a compromise increase the ICC said the rates sought by the carriers "would be unduly burdensome to many shippers." But the ICC added: "Because of the continued car shortage, and the general practice of many shippers of unduly detaining cars under loads, we are persuaded that an increase in demurrage charges is necessary."

Virginia's Western District Court ruled that independent contractors employed to mine and deliver coal at an agreed price had no economic interest in the coal they mined and are not entitled to depletion.

The ruling was the result of an action, Stilwell v. the United States. The court said that since a coal producing company makes substantial investments to

EQUIPMENT APPROVALS

Nineteen approvals of permissible equipment were issued by the U. S. Bureau of Mines during May.

Joy Mfg. Co.—Type 1CM3BE continuous miner; eight motors, one 26 hp, two 100 hp, one 15 hp, two 10 hp, and two 7½ hp, 250 v, DC. Approval 2-1241, May 2.

Goodman Mfg. Co. — Distribution box; one 800-amp, 250-v breaker. Approval 2-1242, May 6.

Jeffrey Mfg. Co.—Mine fan; one motor, 60 hp, 44 v, AC. Approval 2-1243A, May 6.

International Harvester Co.—Type TD6 diesel tractor with Drott front-end loading equipment for use in non-coal mines. Approval 2410, May 6, 1957.

Goodman Mfg. Co. — Type 2410 coal cutting machine; two motors, one 30 hp and one 50 hp, 250 v, DC. Approval 2-1244, May 7.

Mine Safety Appliances Co.—Wet rock dust distributors; one motor, 5 hp, 250 v, DC. Approval 2-1245, May 8.

Compton Mfg. Co. — Type CU41 mining machine; two motors, each 50 hp, 250 v, DC. Approval 2-1246, May 8.

Joy Mfg. Co.—Type 5CM-1BE continuous miner; five motors, one 30 hp, two 10 hp, and two 100 hp, 250 v, DC. Approval 2-1247, May 9.

Joy Mfg. Co.—Types 10SC12PH/PXH-10 cable reel shuttle cars; five motors, one 20 hp, two 10 hp, two 25 hp, 3 phase, 440 v, 60 cycles, AC. Approval 2-1248A, May 9.

Joy Mfg. Co. — Types 10SC6PH/PXH-10 cable reel shuttle cars; five motors, one 20 hp, two 10 hp, two 25 hp, 3 phase, 440 v, 60 cycles, AC. Approval 2-1249A, May 10.

Southern Research Institute — Dust counter. Approval 2-1250, May 10.

Goodman Mfg. Co. — Type 965B loader; four motors, each 20 hp, 250 v, DC. Approval 2-1251, May 10.

Joy Mfg. Co.—Type 2BT-2E continuous miner; five motors, two 100 hp, two 15 hp, and one 30 hp, 250 v, DC. Approval 2-1252, May 10.

Wilcox Mfg. Co. — Model WCM-HED-25 miner; two motors, one 50 hp and one 5 hp, 250 v, DC. Approval 2-1253, May 15.

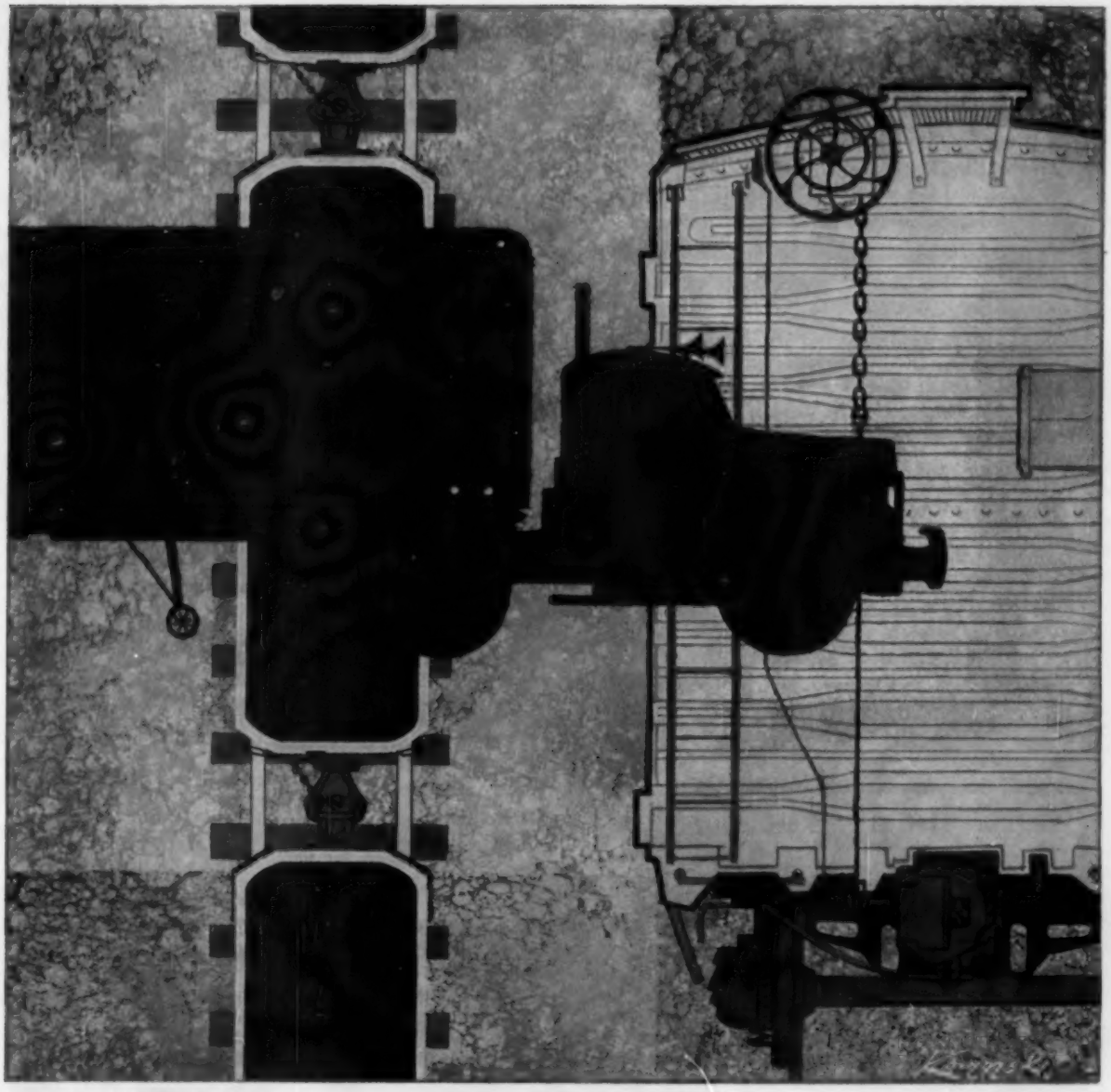
Joy Mfg. Co. — Type PL11-23RPE portable elevating conveyor; one motor, 15 hp, 250 v, DC. Approval 2-1254, May 17.

Galis Electric & Machine Co.—Type 57A electric shaft shovel; one motor, 40 hp, 3 phase, 440 v, 60 cycles, AC. Approval 2-1255A, May 17.

Jeffrey Mfg. Co.—Type 72AR elevator conveyor; one motor; 10 hp, 550 v, DC. Approval 2-847A, May 21. Approval 2-847 covering 250-v conveyors of this type was issued to Jeffrey Mfg. Co. in March, 1952.

Goodman Mfg. Co.—Type 5601 air compressor; one motor, 70 hp, 250 v, DC. Approval 2-1256, May 22.

Plymouth Locomotive Works—Type DMS24 10-ton diesel locomotive for use in non-coal mines. Approval 2411, May 28.



JALTEN low alloy, high-strength J&L steel

provides equal strength with lighter weight

Jalten permits high design loads with reduction in section. Usual reduction is two gages with weight saving as much as 25%.

High strength of Jalten is the result of balanced chemical composition, carefully controlled during production. Strength is retained through fabrication and welding without further heat treatment.

Jalten is available in the forms you require (plates, hot rolled sheets, hot rolled bars, small shapes and structurals). Jalten can be purchased in three grades to meet specific requirements for high strength, formability, impact, resistance to abrasion and corrosion.

Your local distributor can supply you with information on Jalten, or you can write direct to the Jones & Laughlin Steel Corporation, Dept. 411, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

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from all
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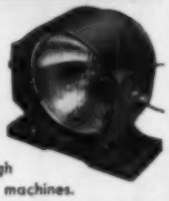
PRODUCTS

HEADLIGHTS
6, 32 and 115 V.
Sealed beam throws powerful light which does not dim with use. Sturdy, long life enclosure suited for rough use on mine locos and machines.



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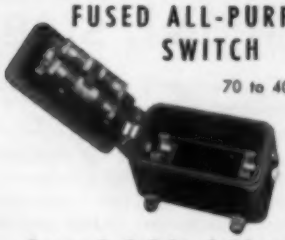
Simple, compact.. designed to perform efficiently under hard use. Completely automatic, the proper circuit is always connected to the power source, whether cable or trolley. Cover is dirt and drip-proof.

"NO-FUSE" TYPE PERMISSIBLE STARTER
For gaseous mines. Inverse time limit element permits maximum motor performance with positive protection. In event of overload it is only necessary to move handle to "reset" position, no fuse to change.

FUSED ALL-PURPOSE SWITCH
70 to 400 amp



For any D. C. Safety Switch application at less initial cost. Compact, sturdy, and thoroughly sealed against moisture. Also made as two circuit-junction box.

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News Briefs (*Continued*)

mine, process and market coal and the contractor had invested only in mine machinery, a short road, and costs of opening and operating, the contractors had no legal right to mine any particular quantity of coal, and did not have the right to mine all the coal under any particular boundary of land. The contract, the court noted, was terminable at will.

Central Illinois Light Co. plans to add 225,000 coal-based, steam-generated kilowatts to its generating capacity.

The company is building two units—one housed in a new plant on the Illinois River south of Peoria, Ill., and another at the R. S. Wallace station in Peoria. The first unit will produce 125,000 kw and is expected to begin distributing in 1960. The second will produce 100,000 kw and is scheduled for service late this year. When the projects are completed the company (Cilco) will have raised its generating capability to 460,000 kw, an increase of 95%.

College freshman Leslie V. Shaffer II won the National Coal Association's second scholarship in fuel technology at Penn State University's College of Mineral Industries.

A graduate of Harrisburg's (Pa.) John Harris High School, Mr. Shaffer was graduated 16th in a class of 275. He majored in chemistry and mathematics. During summer vacations he will work at the Pittsburgh laboratories of Bituminous Coal Research, Inc.

The public Service Co. of Indiana is doubling the generating capability of a 300,000-kw station being built at New Albany, Ind.

Doubling the plant's capability to 600,000-kw had been a distant eventuality under original construction plans, but a forecast of increased power needs is causing the company to install two additional 150,000-kw generating units.

U. S. Steel's Frick District is constructing a new ventilating shaft at Robena mine.

The shaft is scheduled for completion in the third quarter of 1958 and will be named the Blaker shaft. It will bring to nine the number serving Robena. Situated southeast of Waynesburg, Pa., along Frosty Run, which is approximately 9 mi underground from Robena slope, the three-compartment shaft will be lined with reinforced concrete to its depth of 578 ft. Fans with a capacity of 400,000 cu ft per min are expected to insure ventilation for future development of mine workings.

A struggle for union jurisdiction on ships owned by American Coal Shipping, Inc., was referred to the National Labor Relations Board.

The referral was made by the National Maritime Union, which petitioned the NLRB to settle a dispute between the NMU and the Gulf District of the Seafarers International Union. The NMU asked for a representative election covering unlicensed personnel employed in the ACS fleet. The two unions have been struggling for representation rights aboard ACS ships for 3 mo. under a hiring formula set up by Federal District Court Judge Lawrence E. Walsh. The petition for an election is a new move in the union struggle. The NLRB, after accepting the petition, turned it over to Arthur Goldberg, a field examiner, to determine whether an election should be held.

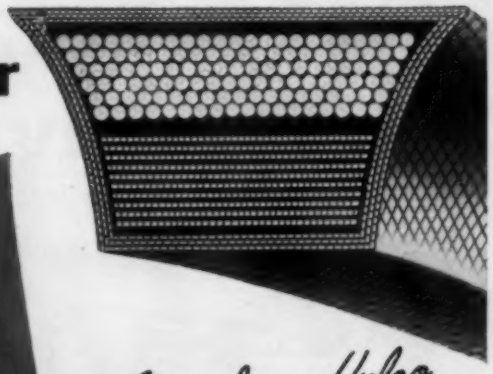
ACS, formed last year by coal operators, railroads, and the United Mine Workers, proposed to operate as many as 80 ships to move coal to Europe. It is operating seven vessels, now. Six of the vessels are chartered from the Maritime

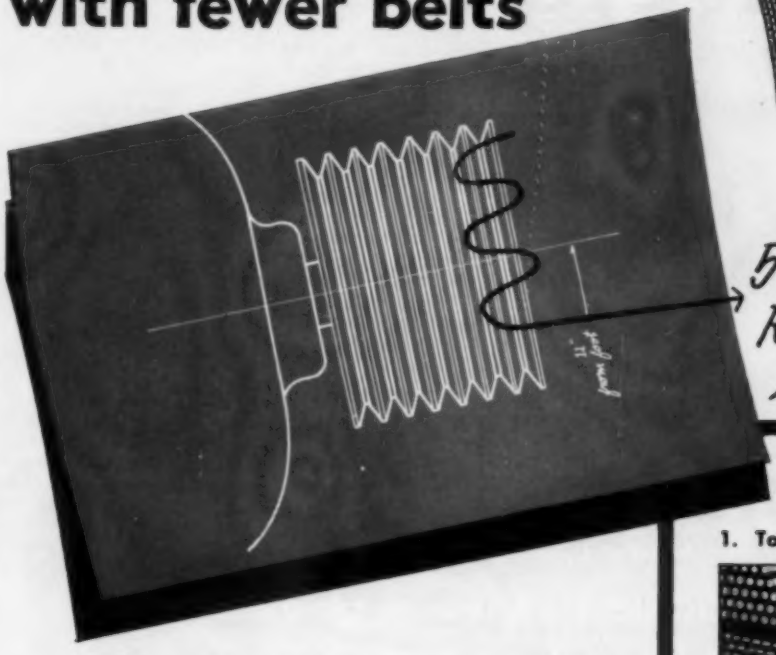
COAL MEN ON THE JOB . . .

ATTENDING INDIANA INSTITUTE MEETING: R. L. Kaga (left), Bixby-Zimmer Engineering Co., Galesburg, Ill.; Placide Mayeur, Supt., Princeton Mining Co., Princeton, Ind.; Richard S. Schuba, Hewitt-Robins, Inc., Louisville, Ky.; and Herber Conrad, Supt., Encoco Collieries, Inc., Bruceville, Ind.

Cut sheave width and weight...

get same horsepower with fewer belts





5 Gates Super Vulco Ropes do the work of 7 standard V-belts

Where space is limited and weight a factor, design your drive with this important fact in mind:

5 Gates Super Vulco Ropes do the work of 7 standard V-belts

That's because a Gates Super Vulco Rope has 40% more horsepower capacity — delivers more horsepower per dollar invested than any standard V-belt drive. Sheaves with fewer grooves cost less . . . weigh less . . . take less room. Drive design is invariably improved.

A wealth of drive data is quickly available to you. Simply call your nearby Gates distributor for a Gates V-belt specialist. Stocks carried in industrial centers around the world.

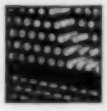
The Gates Rubber Company
Denver, Colorado

GATES Distributors are in the Yellow Pages

The Mark of Gates *Specialized* Research

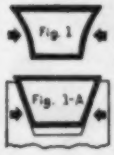
No other V-Belt has ALL these advantages

1. Tough, resilient Tensile Cords



Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.

2. Concave Sidewalls (U.S. Pat. 1813698)



Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (U.S. Pat. 2519590)

A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

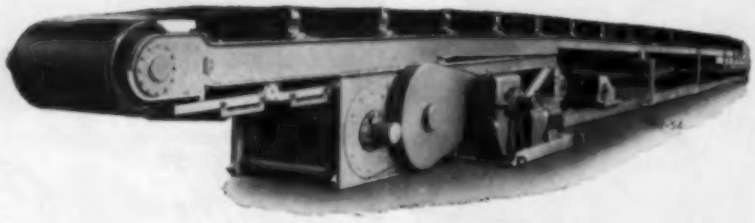
Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

TPA 248

Gates Super VULCO ROPE Drives

For fast main-line haulage,

JEFFREY 80-A BELT CONVEYORS



Record tonnages at the mine face demand that coal be hauled away fast, or production will bog down. Jeffrey offers a solution, the 80-A Belt Conveyor.

Its husky head was designed especially for rapid, heavy haulage... built for drives up to 160 HP and belt speeds up to 600 FPM. It has tandem drive for maximum contact with drive pulleys, and a pneumatic takeup for proper slack tension on the belt.

The 80-A frame is adaptable to 30, 36 and 42-inch conveyor belts and permits a choice of various standard Jeffrey idlers. Let us quote on your requirements. The Jeffrey Manufacturing Company, 912 North Fourth Street, Columbus 16, Ohio.

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News Briefs *(Continued)*

Administration, which held up delivery of 21 more when the interunion strife developed.

The first four commercial units of the coal-fired BCR automatic steam generator developed by Bituminous Coal Research, Inc., are being built for an Ohio florist and a college.

Three of the generators are being bought by Otterbein College, Westerville, Ohio. The fourth is being purchased by Walter J. Engel, Inc., Columbus florist. The design of the equipment, which has been engineered for installation in commercial and small industrial plants, permits the use of either steam or hot water heating. Equipment includes a water-cooled pulsating grade and a water-tube boiler. Coal-feed and ash-removal are automatically controlled by a BCR-patented control system. BCR has been allowed several claims by the U. S. patent office on the boiler, in addition to claims on the unit's stoker-timer.

The BCR steam generator is smaller than conventional stoker-boiler plants with the same output and is competitive with oil-fired units. The two Ohio sales were made because the buyers found they would save "substantial" sums with the steam generator rather than with oil-fired equipment, since in the Columbus area the cost of No. 5 oil is more than twice the cost of coal.

Oral arguments will begin July 29 on a $12 million suit filed against the United Mine Workers.

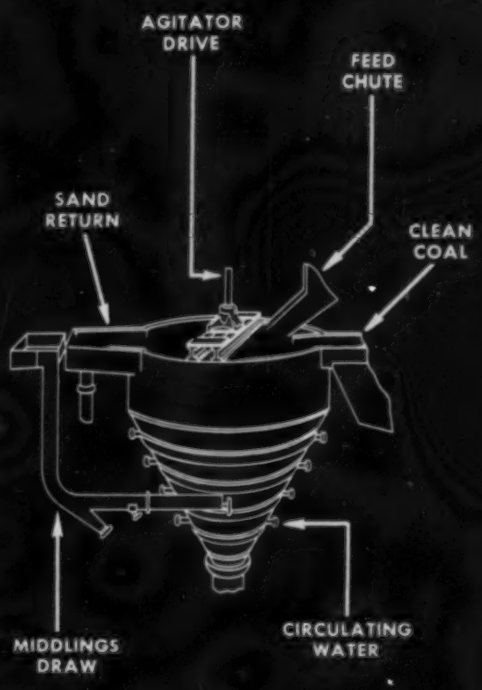
The suit is being brought against the UMWA by the Osborne Mining Co., Whitely County, Ky.; the Love & Amos Coal Co., Nashville, Tenn.; John Amos, Franklin, Tenn., and Clifford J. Osborne, Laurel County, Ky. The coal companies and the individual plaintiffs charge that union-inspired coal field violence in 1955 caused the companies to lose a Tenn-

COAL MEN ON THE JOB . . .

OHIO RIVER COLLIERIES CO.—Cheshire mine, Cheshire, Ohio: David Rohe (left), chief engineer and William Webb, master mechanic.

FAIRMONT

CHANCE CONE



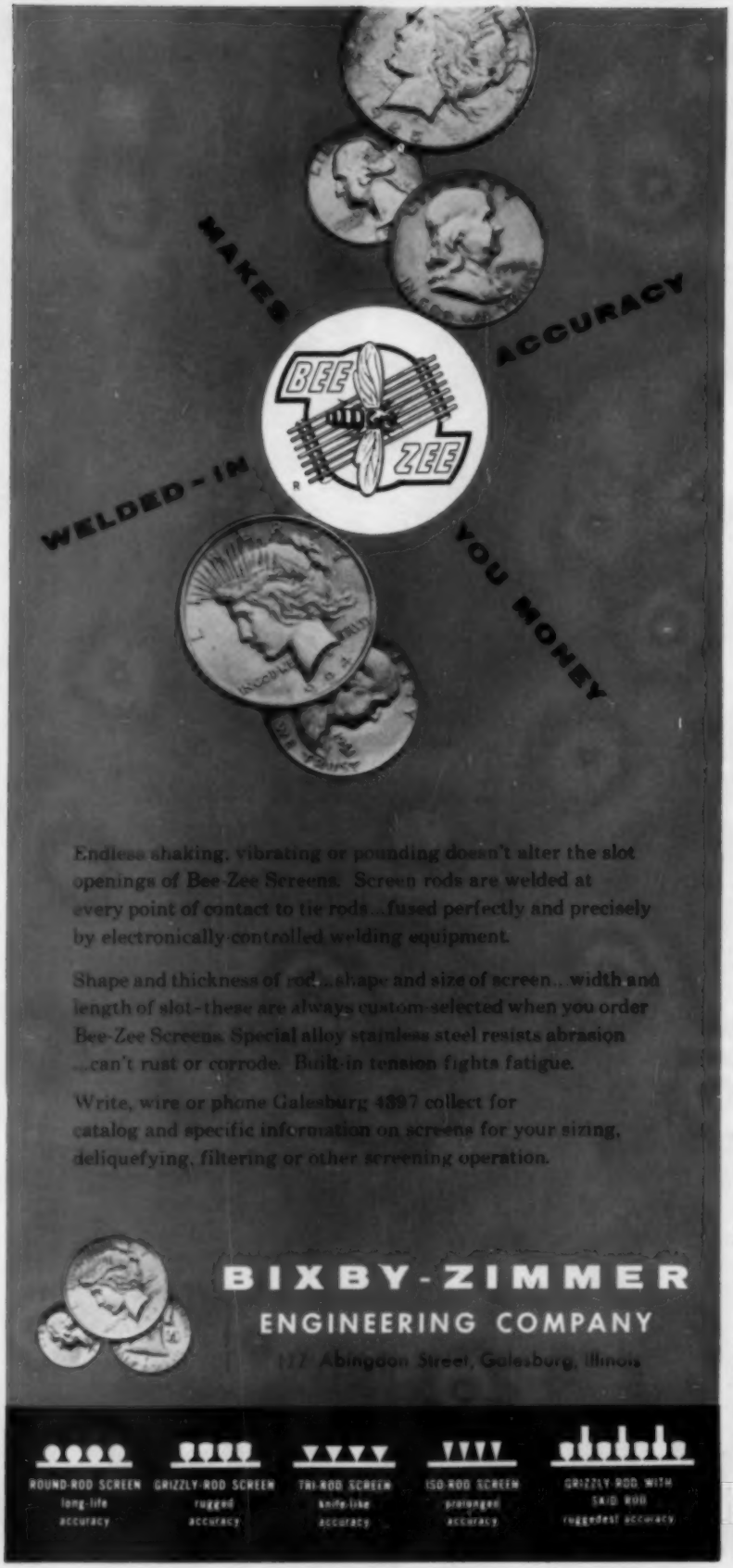
Processing more than 50,000 tons of coal per hour throughout the industry.

■ The Chance Cone is now made only by Fairmont Machinery in the United States. Fairmont manufactures, sells and services (both new and old) this coal cleaning apparatus. The Chance System successfully processes coal of widely varying characteristics at operating specific gravities ranging from 1.35 to 1.65 with sizes from ⅛" to 10".

■ Thoroughly dependable, Chance Cones require only normal maintenance and will recover close to 100% of marketable coal at minimum cost per ton. The operation is handled by only the part-time attention of one man.

FAIRMONT
MACHINERY COMPANY
FAIRMONT, WEST VIRGINIA

Designers and Constructors of Complete Coal Preparation Plants Using Both Wet and Dry Cleaning, Centrifugal and Thermal Drying.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ACCURACY
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GRIZZLY-ROD WITH SKID ROD ruggedest accuracy

News Briefs *(Continued)*

essee Valley Authority contract. They filed their complaint January 7 in Tennessee's U. S. District Court, Knoxville, under the Taft-Hartley Act. Under the act the plaintiffs contend they should be awarded triple damages in addition to $1.3 million in punitive damages. On July 29, the opening date of oral arguments, the UMWA is expected to enter a motion for dismissal of the suits on grounds that coal companies and individuals cannot legally seek damages in a class action. Judge Robert L. Taylor established the date of arguments.

The Princess Elkhorn Coal Co., David, Ky., the winners of its 13th annual scholarship program.

The winners, five this year, bring to 55 the number of grants made to outstanding high school seniors in Kentucky's Floyd and Johnson Counties. This year's winners—Albert L. Akers, Louisa, Ky., a mechanical engineering student who will enroll at the University of Kentucky; Darryl D. Brown, Brainard, Ky., engineering, University of Kentucky; Helen Sue Hager, commercial student, Pikeville College; Nola Dean Allen, Risner, Ky., pre-medical student, Pikeville College; and Troy Lincoln Burchett, Stambaugh, Ky., engineering, University of Kentucky. All the grants were for four years of study.

Glen Alden closed Buttonwood Colliery in Hanover Township, Pa.

Earlier this year operations had been suspended, but the company had planned to resume them. In April a fire broke in the colliery's Inman Shaft, trapping two men who were rescued 13 hr later. The decision to close the Colliery came late in May. Company officials said there was no need to work higher cost operations.

Reynolds Mining Corp. acquired coal deposits on the shores of Lake DeSmet in northern Wyoming.

The area is one in which Reynolds want Pacific Power & Light Co., Portland, to build a steam plant to power an aluminum reduction plant that Reynolds may build at Lake DeSmet. The land acquisition amounts to 320 acres of coal property, but is an addition to acreage it acquired last fall.

Old Ben Corp. established a new scholarship in mining engineering at University of Illinois.

Employees and son of employees of Old Ben Coal Corp. and residents of

Meetings

International Briquetting Association, Biennal Conference, Aug 19-21, Colorado Hotel, Glenwood Springs, Colo.

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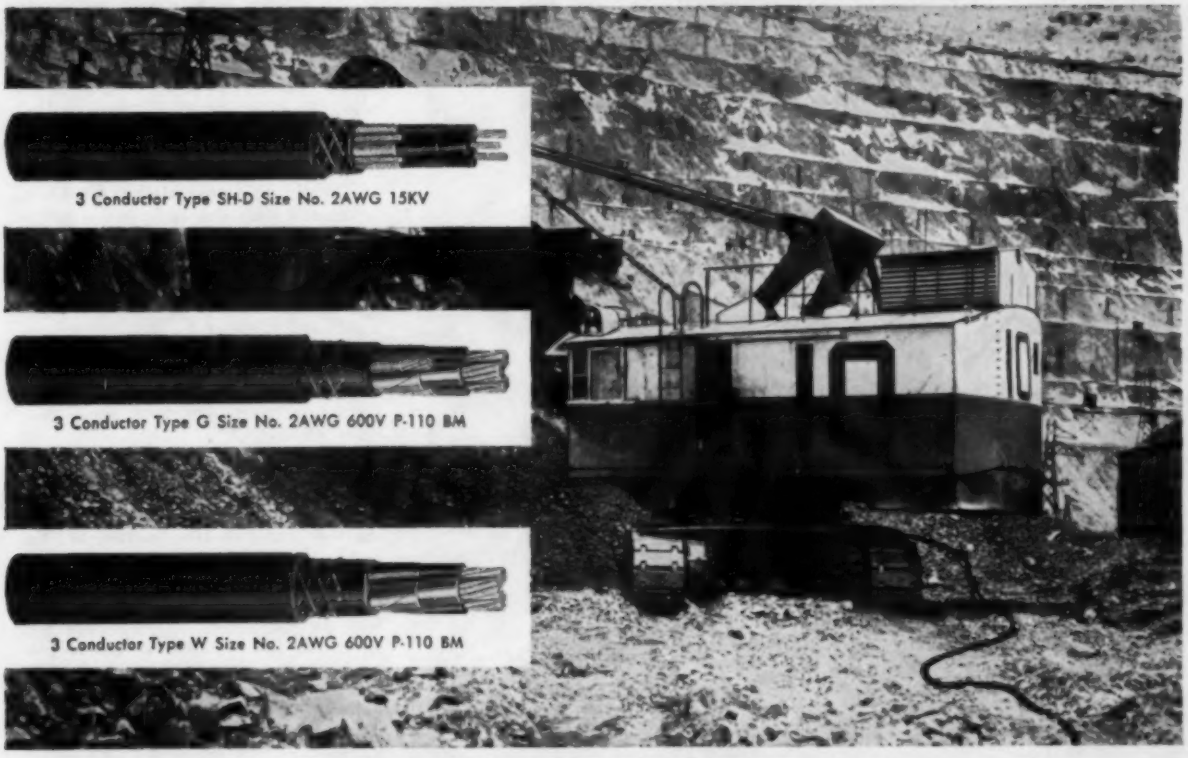
PORTABLE POWER and MINING CABLE


3 Conductor Type SH-D Size No. 2AWG 15KV
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SUPERTUF neoprene jacket far exceeds the requirements of ASTM D-752, and all 600 volt SUPER SERVICE portable cables bear the official approval number P-110 BM embossed in the jacket indicating compliance with the flame resistance requirements of the Pennsylvania Department of Mines and requirements of the Federal Bureau of Mines.

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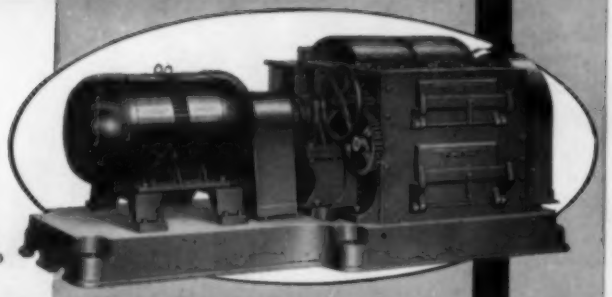
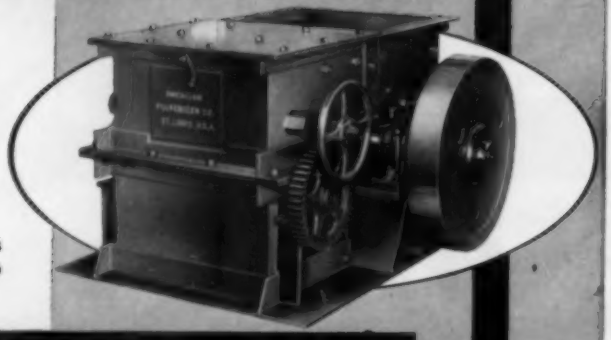


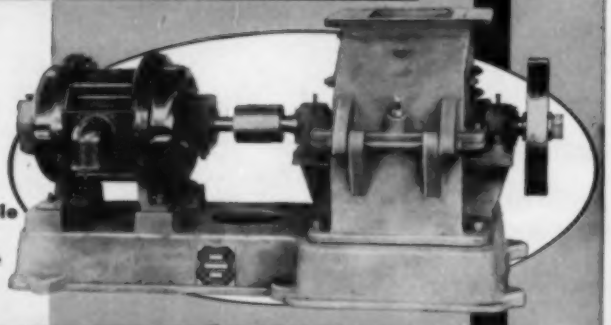
AC Series
capacities to
800 TPH

Reduction
Cost Per Ton . . .



WC Series
capacities to
90 TPH

the Best Answers*. . .



Coal Sample
Crushers
capacities to
2000 Lbs.
Per Hr.

Come from American
Ring Coal Crushers

*In a recent independent survey, it was found that American Crushers reduced over 61,000,000 tons of coal at a parts replacement cost (including standby parts) of less than 1/10th of 1¢ per ton.

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American
PULVERIZER COMPANY

WRITE for Literature on These Crushers

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News Briefs (*Continued*)

Illinois coal producing areas will be given preference over other applicants for the award, which is worth $500 a year. The winners of the scholarship must graduate in the upper third of his high school class and satisfy the entrance requirements of the University of Illinois College of Engineering.

The U. S. Bureau of Mines will award a new safety trophy at the National First-Aid and Mine Rescue Contests in Louisville, Ky., October 2-4.

The trophy is a medallion authorized by Congress. It will be awarded to the winning combination team, or the team attaining the highest score among those entered in both first aid —and in mine rescue events.

J. W. Kepler, sales vice president of Pittsburgh Consolidation Coal Co., estimated that the bituminous industry would spend over $100 million this year for new mine capacity.

The Pitt Consol executive said that projects for 30 million tons of replacement and additional capacity are already underway. "Allowing 3 yr for mine completions, on the average," he said, "this year's capital expenditures for these mines will total more than $100 million."

The Cheaspeake & Ohio Ry put into operations its car location information center in Huntington, W. Va.

The center will be served by the world's largest railroad teletype network of 24,000 mi of circuits connecting 238 teletype installations. The circuits will cover the C&O's 5,000-mi system plus its 54 traffic offices in the United States and Canada. M. I. Dunn, vice president of operations, says: "For the first time on any railroad exact car location information will be almost instantaneously available to our shippers and receivers."

North American Coal Co. disclosed plans to develop a $10 million mine in Monroe County, Ohio.

Henry B. Schmidt, president of North American, said that demand from Ohio Valley industries prompted the company to acquire 17,000 acres of coal containing land.

The Federal Power Commission predicts that electric power loads, capacity, and production by utilities will more than triple by 1980.

In a report written by FPC staff members, the FPC says that by 1980 power loads will reach 335 million kw, compared with 103 million kw in 1955. This, the FPC declares, would mean increasing capacity from 114 million kw in 1955.

(*Continued on p 153*)

ACME jumbolter now has 4 wheel drive

plus elevating platform for greater manuverability

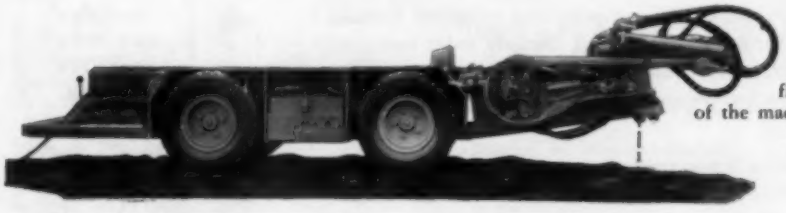
The ACME Model HSJ-4WD Jumbolter can work an area 23'10" wide without moving. The air-articulated arms reach out 9' in front of the machine.

Each arm operates independently and swings 270 degrees.

Each wheel on the ACME Model HSJ-4WD is a driving unit with individual suspension. Large gear reducers are rugged enough to withstand the roughest floor conditions.

The versatile ACME Model HSJ-4WD Jumbolter is now equipped with tractor-type 4 Wheel Drive permitting shorter turning radius. Left hand and right hand wheels are integrated units so that by reversing the wheels on one side while driving forward on the other side the Jumbolter can be made to turn in almost its own length.

Available with either one or two air-articulated arms, each individually controlled, the ACME Jumbolter permits bolting in a wide flexible pattern from 8' to 10' back of the working face.



The front platform of the Model HSJ-4WD can be elevated 8" to clear floor obstructions during forward movement of the machine. Hydraulic cylinders raise and lower the platform. A locking device holds platform for in-tram position. Complete details of Model HSJ-4WD are given in Bulletin 4WD.

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MORGANTOWN, W. VA.

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Sinclair Super TENOL withstands such punishing conditions because it's specially made for tough going. High viscosity index base oils, combined with an exclusive formula of selected additives, give your Diesel the greatest protection against varnish, sludge, rust and acid corrosion.

Refill now with Sinclair Super TENOL Motor Oil. Contact your local Sinclair Representative for further information, or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N.Y. *There's no obligation.*

Dino, the Sinclair Dinosaur, says:

SINCLAIR SUPER TENOL

News Briefs *(from p 150)*

386 million in 1980, and raising electric energy production from 553 billion kw in 1955 to 1,821 billion by 1980. A similar forecast in 1955 indicated that the 1980 load would be 312 million kw, a figure 7% below the present prediction. The greatest rate of growth is expected in the Pacific Southwest. Population growth and expanded industries are the reasons.

The 11th annual Moshannon-North Central Safety Association first aid meet was won by Kramer mine, Stump Creek, Pa.

Led by Stanley Verona, captain, the Kramer first aid team scored 99.733 points. Kramer mine is operated by the Northwestern Mining & Exchange Co., Dunmore, Pa. Its first aid team received $210, a Mine Safety Appliances plaque and a United Mine Workers banner. Runners up among the four other participating teams were: 2nd place, Ringgold Cleaning Plant, Freebrook Corp., captained by Kenneth Dinger; 3d place, Cadogan mine, Allegheny River Mining Co., captained by David McCafferty; 4th place, Maxton No. 1 mine, Morrisdale Mining Co., captained by Nile Linberg; 5th place, Springfield No. 6 mine, Clearfield Mining Co., captained by Wasco Kopalchuk. The Moshannon-North Central Safety Association first aid contest is composed of first aid teams from bituminous districts comprising the North Central Section of Pennsylvania.

Current Coal Patents

By Oliver S. North

Drive for belt conveyors, A. R. Biedess (assigned to Goodman Mfg. Co.), May 14, 1957. In an improved driving mechanism for a belt conveyor, the need for a driving roller is eliminated by having the belt driven along one of the reaches thereof by endless gripper belts. Overloading of the gripper belt drives is automatically prevented. No. 2,792,104.

Dust collector, E. M. Becker and R. E. Brochetti (assigned to Mine Safety Appliances Co.), May 14, 1957. Design for a dust collecting device for use with drills that are being used to form bolt holes in mine roofs, so that the rock dust falling down out of the holes can be caught and readily disposed of, usually to waste. No. 2,792,199.

Mining apparatus with rotary cutting and dislodging drum, F. Cartlidge (assigned to Goodman Mfg. Co.), May 14, 1957. An improved gear and shaft arrangement for a mining machine which avoids use of universal couplings yet provides clearance for material to pass onto the conveyor, and at the same time permits the gathering apron to be pivotally adjusted to follow variations in the floor level. No. 2,792,204.

Mining machine having a wedge thrusting action, L. D. Hagenbook (assigned to Goodman Mfg. Co.), May 14, 1957. This improved mining machine of the picking or wedging type provides for application of the wedging action at such an angle with respect to the coal face as to continually break off the coal along its normal line of failure. No. 2,792,205.

Mine cars, J. L. Kersey, Jr., and F. N. Kersey, May 28, 1957. Design for an improved mine car for straight line transportation without transfer of coal. No. 2,793,603.

Mobile loading machine, J. D. Russell (assigned to Joy Mfg. Co.), May 28, 1957. This mobile loading machine of the frontal attack is particularly suitable for use in coal mines having low head room. No. 2,793,732.

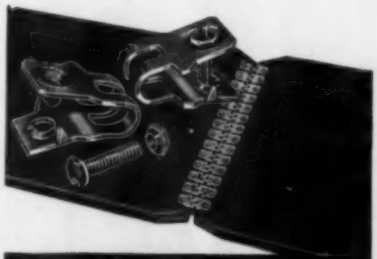
Scraper conveyors, C. S. Sandeman and R. H. Reed (assigned to Mavor & Colson Ltd.), May 28, 1957. Design for an improved scraper conveyor for use in

HINGED PLATEGRIP
BELT FASTENER No. 500
FOR HEAVY CONVEYOR BELTS OF CHANGING LENGTH

These heavy-duty belt fasteners make a strong, flexible joint in conveyor belts, belts of any width and of from 3/16" to 1/2" thickness. They offer special advantages in mines, quarries or industrial setups where length or position of belt is frequently changed, because sections can be removed or added at will. Joints are opened for this purpose by simply pulling out the hinge pin.

Easily and quickly applied on the job or in the shop. Special design gives deep compression into belting and smooth, flush joint.

Write for Circular



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This is the kind of super-duty job

——where Leschen Flattened Strand wire rope often outlasts others by 100% or more.

Your nearby Leschen man can give you all the facts—and service records to prove them. Your own records—after using Leschen Flattened Strand—may very well give you final proof.

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HKP LESCHEN WIRE ROPE DIVISION
H. K. PORTER COMPANY, INC.

Coal Patents (*Continued*)

mining coal by the longwall system. No. 2,793,737.

Method and means for concentrating valuable components of placer gravel, F. C. Peterson, May 28, 1957. Although primarily designed for concentration of gold placer gravels, this jig concentrator is readily adapted to the separation of coal from slate. Pulsation is imparted to the bed by means of an oscillating transverse wall, the mechanism being so designed as to prevent suction in, and compaction of, the shot bed. No. 2,793,750.

Continuous mining machine having a laterally movable mining head, S. C. Moon (assigned to The Jeffrey Mfg. Co.), May 28, 1957. A continuous mining machine having a laterally movable cutting head and adapted to cut, dig, and gather coal at the face of a mine room, and load it onto a car or the like. No. 2,793,848.

Material breaking cartridge, J. C. Hesson and J. L. Smith (assigned to Cardox Corp.), June 4, 1957. An improved re-useable compressed-gas cartridge for use in breaking down coal in mines. No. 2,794,395.

System for gasifying coal, B. J. Mayland (assigned to Phillips Petroleum Co., a corporation of Del.), June 4, 1957. In an improved system for gasifying coal, heated refractory pebbles are coated with coked low ash-fusion-temperature coal. The material is treated with oxygen and steam in a gasification chamber and the gases recovered.

Manufacture of gas mixtures containing carbon monoxide and hydrogen, W. G. Scharmann (assigned to Esso Research & Engineering Co.), June 4, 1957. A method for manufacturing from coal, coke, peat, and the like gas mixtures suitable for catalytic synthesis of hydrocarbons. No. 2,794,725.

Process of making a flowable solid ore-carbon mass, C. E. Lesher (assigned to Lesher & Associates, Inc., Pittsburgh, Pa.), June 4, 1957. Iron ore fines are coated with finely ground coking coal to form a product suitable for use in the metallurgical reduction of iron. No. 2,794,728.

Method of underground electrolinking and electrocarbonization of mineral fuels, E. Sarapuu (assigned to Electrotherm Research Corp., Minneapolis, Minn.), June 11, 1957. An electrical method for underground gasification of coal or the like without drifting or shaft sinking for preparation of the seam.

Separation of granular materials, F. Schaub (assigned to Ruhrchemie Aktiengesellschaft, Oberhausen-Holten, Germany), June 11, 1957. This apparatus for particle size classification of coal or other comminuted materials provides for uniform contacting of the material with

Coal Patents (*Continued*)

a rising gas stream having a velocity adequate to exhaust fines through a stack. Gas velocity may be adjusted as desired. No. 2,795,329.

Apparatus for separating solid materials by suspension, A. Dony (assigned to Societe Preparation Industrielle des Combustibles, Fontainebleau, France), June 11, 1957. An improved heavy media apparatus for effecting a two stage separation and classification of coal, ores and the like. A light, a heavy, and an intermediate product are produced. No. 2,795,331.

Shovel loading mechanism for shuttle cars, E. B. Steele (assigned to Joy Mfg. Co.), June 11, 1957. An improved shuttle car shovel loading mechanism of the hydraulically actuated type. The shovel can pick up material at various lateral points without the necessity of moving the shuttle car laterally. No. 2,795,342.

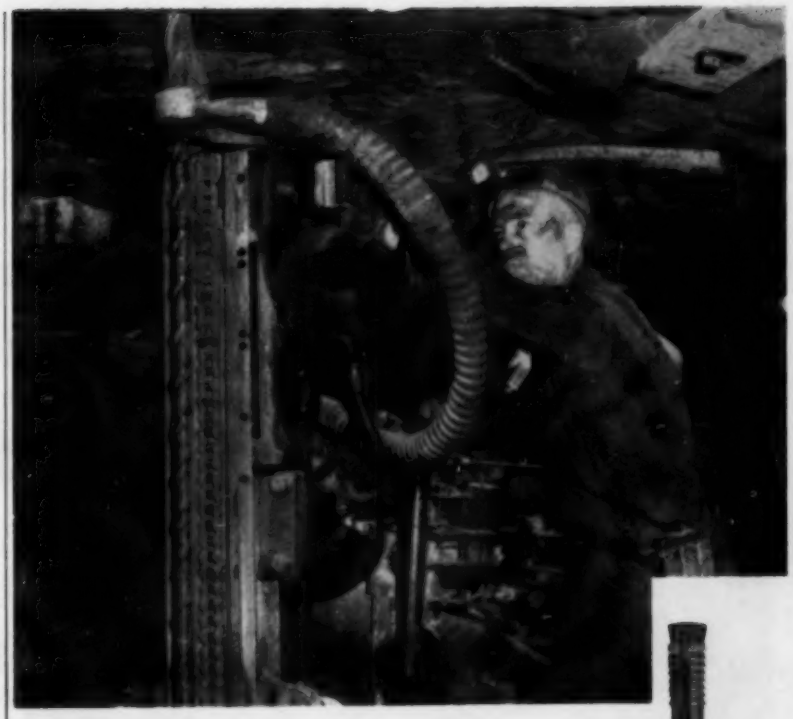
Mining equipment of the planer type having a pivotally mounted planing head, H. Bobersen, June 11, 1957. In this continuation of U. S. Patent No. 2,745,651, covering a coal planer, the pivot point around which the planer head tilts is made adjustable in order to control and change the downward pressure and depth of cut of the operating cutting blade. No. 2,795,407.

Continuous mining machine with cutter speed control responsive to cutter position, R. H. Goodrich (assigned to Joy Mfg. Co.), June 11, 1957. This continuous mining apparatus provides means for decreasing velocity of cutting elements as sumping action changes to shearing action, and for automatically resuming sumping velocity upon return to sumping action. No. 2,795,408.

Association Activities

Dennis J. Keenan, operations vice president of the Sterling Coal Co., was reelected president of the Central Pennsylvania Safety Association. The association's first aid meet will be held August 3, in Hastings, Pa.

The Midwest Coal Producers Institute elected officers during a Chicago meeting June 11. The elected officers were: chairman, **Stuart Colnon,** president of the Freeman Coal Mining Co., Chicago; president, **Gregory S. Devine,** vice president of the Peabody Southern Coal Sales Co., Chicago; vice president, **W. S. Webster,** vice president of Walter Bledsoe & Co., Terre Haute, Inc.; vice president, **Mark Eastin Jr.,** president of West Kentucky Coal Co., Madisonville, Ky.; treasurer, **Frank E. Kolbe,** president of the United Electric Coal Cos., Chicago. **A. J. Christiansen,** Chicago, was reelected secretary of the institute.



Production Stays Up, Too...

...with West Virginia Mine Roof Bolts!

Eliminate production holdups and be assured of the maximum in safety, service and economy by specifying West Virginia Mine Roof Bolts.

Expert field engineering service, deliveries as scheduled and highest quality products are yours with

West Virginia Mine Roof Bolts

For prompt, personal service and attention to your needs, call, wire or write West Virginia Works, Connors Steel Division, H. K. Porter Company, Inc., Huntington, West Virginia.

CONNORS STEEL DIVISION
H. K. PORTER COMPANY, INC.

FRANCE

▲**HYDRAULIC FILLING** at Merlebach is done with sand from nearby hills and water. Here, water is drained from filled area.

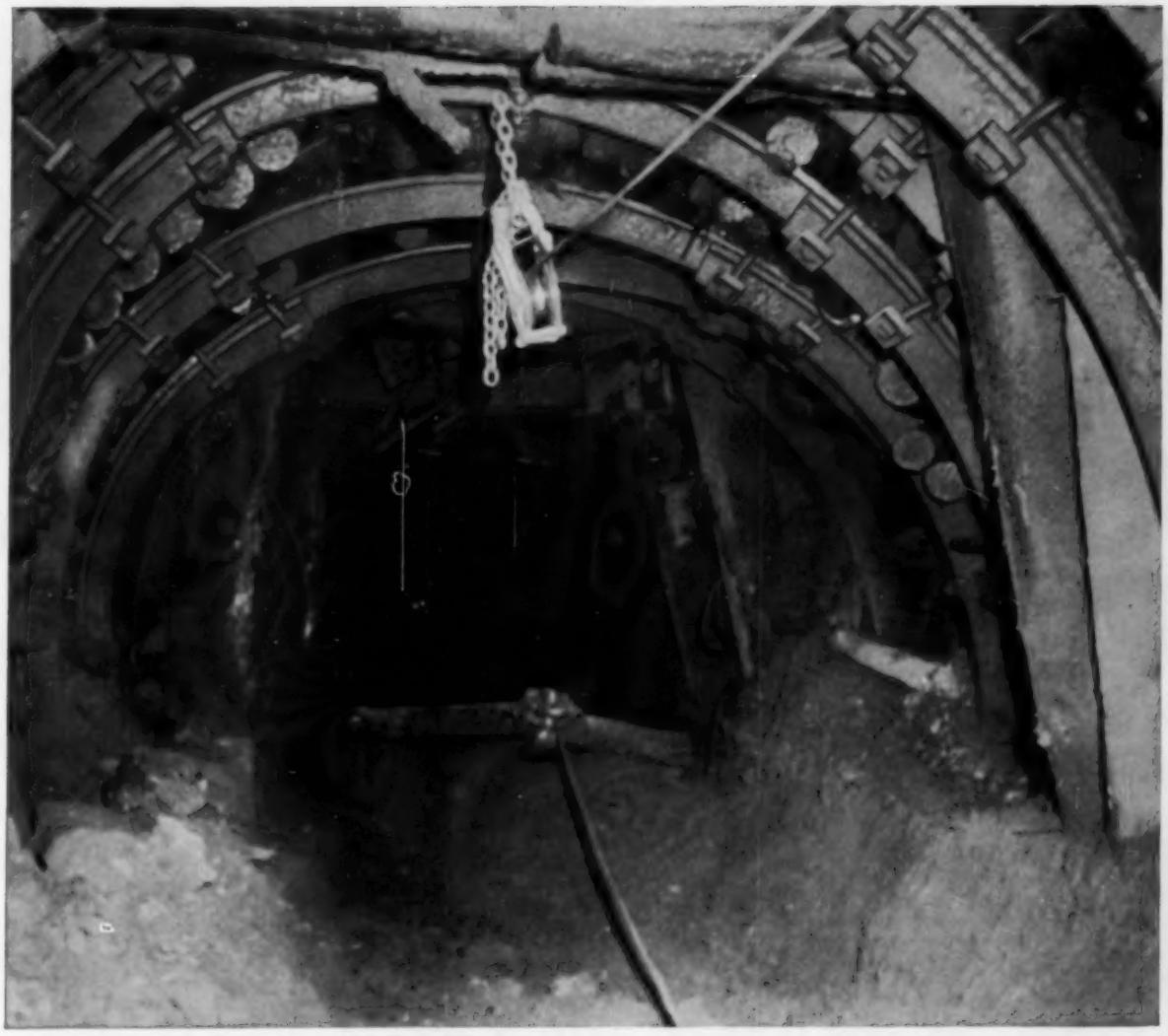
◀**NEAR-VERTICAL SEAMS** of France's Merlebach mine are an aid to 13,200-tpd production rate, say officials. Here, the face has been cut into steps, or tiers, to prepare for blasting. Tiers are 9¾ ft deep, more than 3 ft high.

Europe's Record Holder

Merlebach, an underground mine situated in France's Lorraine Basin, has for some time held the lead in average output per man shift in both France and in Europe. The output figure – 3.85 – is hardly exciting to most U. S. bituminous operators when it is compared with output rates here. But in France, where the average output is 1.87 tons per man shift, and where most seams are vertical or tipped, the figure becomes a meaningful one.

Merlebach is more than 100 yr old. It produces 13,200 tpd, a figure that exceeds all French mines. French officials say that the reasons for Merlebach's high production rate are 1) the mine's almost vertical seams, which permit large numbers of miners to work at the same time, and 2) the thickness of the seams —up to 29½ ft. One other factor also aids production. That is the nearby position of sand hills, which provide sand for hydraulic filling.

◀**AFTER BLASTING** coal is loaded into a shaking conveyor for movement to cars and then to surface. Merlebach has seams up to 29½ ft thick. Seam above, in Pit No. 5, varys from thin to middlesize, or up to 10 ft.



See how the Yieldable Arch "*gives*" under excessive pressures

That is just what Bethlehem's Yieldable Arch was designed to do. Each arch set is made up of segmental sections which nest together at points of overlap, as is clearly shown in illustration. These overlapped joints are held by U-bolt clamps which are drawn up tight enough to create the right amount of friction. Under excessive load, however, the joint will yield, which it has already started to do in the installation shown above.

Where underground conditions are difficult no rigid roof support, however strong, can indefinitely withstand the dynamic pressures caused by the weight and subsidence of the overburden. What's needed is a support scientifically designed to yield *gradually*, in order to keep the drift open while an area is being worked out.

Thus you can see that it's not the strength but the "give" of the Yieldable Arch that holds a tunnel or drift open. Because the arch sets yield before the steel deforms, they are recoverable for use elsewhere. In mines where the Yieldable Arch is at work, it is paying for itself amazingly quickly, sometimes in a matter of months.

The Yieldable Arch is easy to install without special equipment or skills. One of our engineers will be glad to look over your workings and see what the Yieldable Arch has to offer you. You can reach him by calling or dropping a line to the nearest Bethlehem district sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

The SIMPLE LOW COST WAY to RECOVER COARSE COAL FINES

with

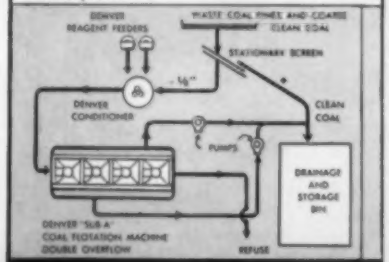
DENVER "Sub-A" COAL FLOTATION

HANDLES 1/8" FEED

With Denver "Sub-A" Flotation machines you can handle 1/8" feed. Ability to float coarse fines eliminates costly intermediate treatment steps, aids fine coal dewatering and water reclamation, simplifies construction of fine coal recovery systems.

Although coal particles as coarse as 1/8" may not always be completely recovered by the flotation process (which is most effective with minus 28 mesh coal), you will recognize the advantage in simplification provided by handling all of the undersize from coal cleaning and recovering all floatable coal in one low in ash product.

Over 95% of all coal flotation plants in the U. S. use Denver "Sub-A". Why not follow their lead? Case histories on request.



DENVER EQUIPMENT CO.

1400 Seventeenth St. Denver 17, Colorado

TV MONITORING AND CONTROL of a conveyor system has been introduced in Britain's Manvers preparation plant. In photo engineer not only scans operation remotely, but starts and stops belts.

GREAT BRITAIN

Oil, Coal-Fired Station

The Central Electricity Authority opened a $75 million power station equipped to burn oil or coal. The station is at Marchwood in the south of England. Being partially operated now, it will be finished in 1959, and supply half the needs of a million consumers. The station is so situated that it can burn oil from an Esso refinery or seaborne coal from colliers berthed at Southhampton. Marchwood is producing 240,000 kw now, about half as much power as it will be capable of producing in 1959. At present it is burning 185,000 tons of oil a year.

4,000-Tpd Mine

Northwest England is getting its first new coal mine in 50 yr. The mine will be named Parkside Colliery, and is expected to be operating by 1965 at a 4,000-tpd rate.

Forecast Oil Import Boost

Britain's paymaster general, Reginald Maulding, believes the British will have to increase oil imports 50% to meet the power requirements of 1965. By that time, he told Parliament, inland demand for fuel will rise from 250 million tons of coal equivalent in 1955 to 300 million tons. The increase represents a boost in industrial production during the 15-yr period of 3½% a year. Mr. Maulding said that nuclear stations are scheduled to produce electricity equivalent to about 14 million tons of coal, and that the National Coal Board hopes to mine additional production of 10 million tons for home use and 10 million tons for export. He concluded that despite the increased coal production, and the nuclear stations about 26 million tons of oil would have to be imported, an amount half again as large as 1955 imports.

Export Sales Sought

British coal exports to western Europe are expected to increase by 500,000 tons a year this fall, almost all of it small coal suitable for power station use.

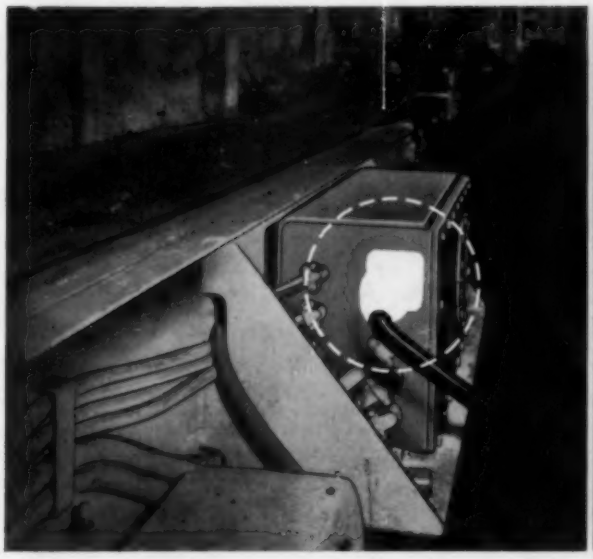
Large stocks of fine coal now are accumulating in the United Kingdom, and the National Coal Board has been negotiating with the European Coal & Steel Community for higher export sales.

In the past Britain's own fluctuating needs have kept the United Kingdom out of the long term export market. As a result about one-third of Europe's coal imports (30 to 40 million tons) come from United States suppliers with contracts ranging up to 3 yr.

The Financial Times of London says now, however, that there is a possibility that Britain may be in a position to offer contracts which will be competitive in length with those of United States suppliers. If so, the price differential between the two countries will make British coal a good buy for European countries.

It is expected that the United Kingdom coal surplus will remain almost entirely fine coal, with no potential existing for the exportation of large sizes, anthracite, steam coal, and coking coal.

Coal industry sources in Britain say that the present level of coal stocks in Europe is high. Germany is said to be expanding exports at the cost of its home market. Poland's shortage of western



What Electrical Connectors would you choose ...for these installations?

Modern mining techniques allow little time for coddling men or equipment . . . so it's a safe bet your answer to the question in our headline will be based on more than just the electrical requirements of the equipment. Such important considerations as safety, efficiency, durability and maintenance cost, will influence your selection. *This is as it should be and we're glad it's true* . . . for the mining industry's constant search for the best available equipment has made JOY Electrical Connectors their preferred choice since 1928.

Why settle for less . . . when the best costs less in the long run?

JOY plugs and receptacles are specifically designed to provide long-range, maintenance-free service under the most adverse operating conditions . . . and they're available in styles and sizes to meet every mining need. Two of the currently *most popular* designs for mining installations are illustrated at right. Equipped with non-corrosive metal couplings and flame-resistant Neoprene bodies, both are moisture-tight, shatter-proof and distortion-resistant.

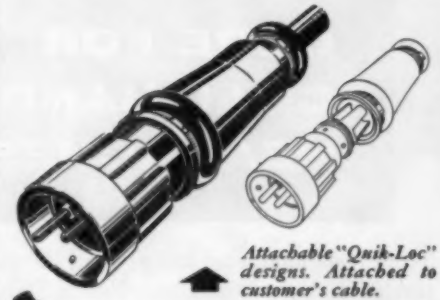
Straight Pin Bigun (SPB)—Have threaded metal couplings. Plugs are factory-vulcanized to 36" cable leads or to lengths as specified. See Bulletin B39a for complete information.

Attachable "Quik-Loc" styles—Attach quickly to customer's own cable. Newly designed couplings completely engage or disengage in ¾ turn. See Bulletin B57 for complete details.

JOY plugs and receptacles are available for both AC and DC applications. In addition, "SPB" and "Quik-Loc" connectors may be supplied with pilot control contacts for *permissible operation* when used in conjunction with JOY'S Bureau of Mines-Approved distribution centers (SCC units). Ask us for complete information, ***Joy Manufacturing Company, Electrical Products Division, 1201 Macklind Ave., St. Louis 10, Mo.*** Executive Offices: Henry W. Oliver Building, Pittsburgh, Pa.

Molded-to-cable "SPB" designs. Have threaded couplings.

Ask for Bulletin B39a.



Attachable "Quik-Loc" designs. Attached to customer's cable.

Ask for Bulletin B57.

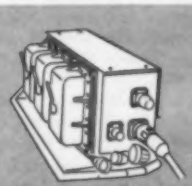
WAD CD8447

Consult a Joy Engineer

JOY

SPECIALISTS IN CREATING ELECTRICAL CONNECTORS FOR MINING AND INDUSTRY SINCE 1928

Write for information on these JOY products

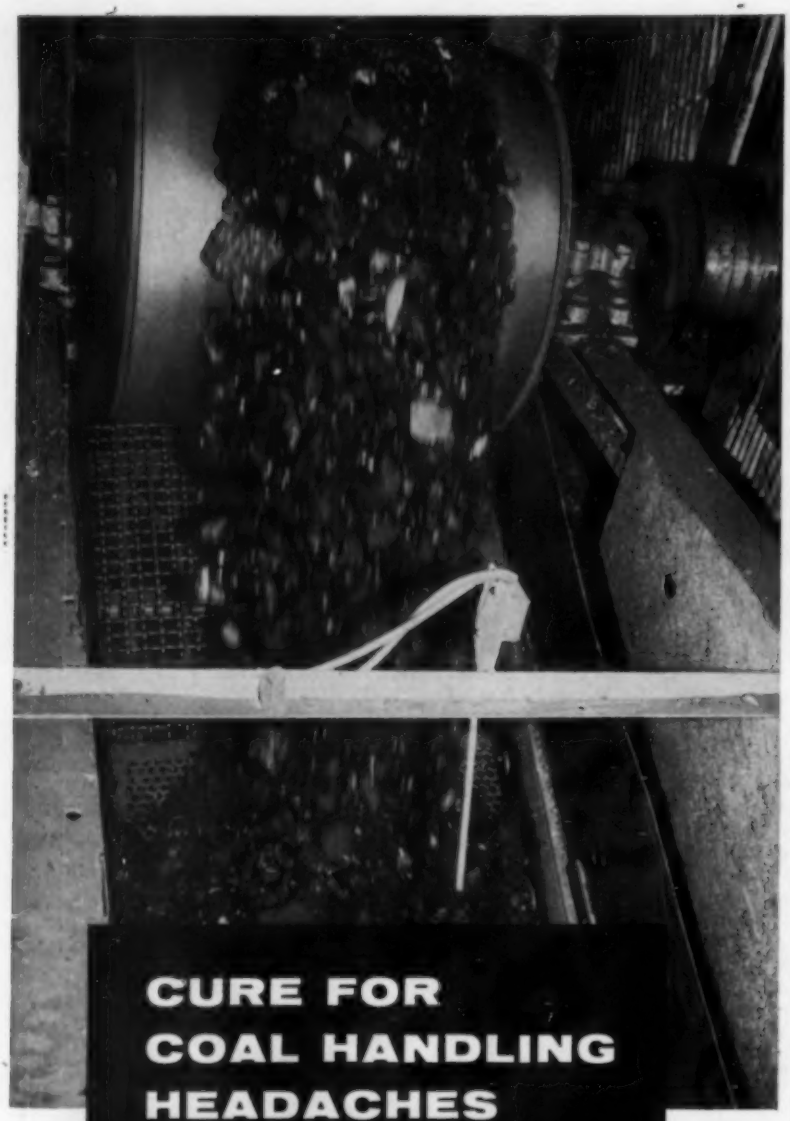


Safety Circuit Centers

Distribution Boxes

Portable Lighting

New Cable Vulconizer



To get out more coal at less cost, Zeigler Coal & Coke Corporation's Bradbury Mine uses a Hewitt-Robins belt conveyor system. Coal, transferred from 5,000 ft. of panel belts to a 4,000 ft. mainline conveyor system, is discharged to a 42" wide, 950 ft., 16° slope conveyor traveling at 450 FPM. This conveyor delivers 450 TPH to an H-R Vibrex Screen which removes fines ahead of the breaker.

The underground haulage system, including conveyor belts, idlers, and machinery, was designed, engineered, and manufactured by Hewitt-Robins. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Conn.

HR HEWITT-ROBINS

CONVEYOR BELTING AND IDLERS...POWER TRANSMISSION DRIVES
INDUSTRIAL HOSE...VIBRATING CONVEYORS, SCREENS & SHAKEOUTS

currencies is so acute at the moment that British observers believe Poland will step up its coal exports to the west by a large amount, even at the cost of its iron curtain markets. This could affect continental demand considerably this winter.

ARGENTINA

Buyer's Switch

Argentina is switching from the United States to Poland as a major coal supplier in an effort to save dollars. The switch was announced by Dr. Julio C. Cueto Rua, Minister of Commerce and Industry. The purchase of 100,000 tons of Polish coal is being negotiated now, and talks are in progress for a contract to supply 500,000 tons a year.

During the first quarter of 1957 Argentina imported about 325,000 tons—all from the United States. The imports, however, resulted in a serious drain on the country's scarce dollar reserves.

Argentina's switch means the return for Poland of an old and valuable customer. In 1954, for instance, Argentina bought 651,000 tons of Polish coal; in 1955 the tonnage was 651,000. In 1956, however, purchases dropped off sharply to a mere 25,523 tons, while the United States supplied 1.21 million tons. Argentina's total coal imports last year were 1.32 million tons.

INDIA

Lignite Development

India will spend more than $144 million to develop the Neiveli Lignite Project in the state of Madras. In addition to relieving a power shortage the lignite mining development is expected to spawn a number of new industries during the next several years. The Neiveli lignite is situated in a 5½ mi tract in Madras' South Arcot district where overburden conditions are reportedly "favorable" for stripping deposits from 1 to 89 ft thick. Reserves are estimated at 200 million tons.

Tests show, however, that the lignite is underlain by artesian water which is said to be exerting an upward thrust of 6 to 8 tons per sq ft. During pumping tests last year the Neiveli lignite analyzed at 50% moisture content, 25% volatiles, 22% fixed carbon and 3% ash. Heating value was 5,599 Btu's.

The current plan is to mine 3½ million tons annually and to utilize the lignite for 1) generating 200 mw of electric power, 2) making 70,000 tons of nitrogenerous fertilizers, and 3) briquetting 714,000 tons annually.

In addition the Indian government's operating arm, the Neiveli Lignite Corp., plans to process the lignite for steelmaking; This, however, is still in a test phase to determine whether the processing is possible.

This long range revolving shovel is one of two Bucyrus-Erie 190-Bs working in large open-pit mine near Central City, Ky.

In the Pit — Where Production Increases Begin
Bucyrus-Erie Electric Shovels Set the Pace

Wherever coal is mined, you will find Bucyrus-Erie electric shovels meet today's needs for increased output. Their advanced design assures not only high daily production but the month-after-month dependability that sustained big output requires.

The modern front end, with exclusive two-section boom, tubular dipper stick and twin dual hoist provides great strength for tough digging, along with reduced weight for loading more payload. Main machinery is powerful, capable of speedy work cycles. Ward Leonard variable-voltage control permits rapid acceleration and deceleration, assures extra torque when it is needed. Heavy-duty construction throughout means low maintenance, long life.

Let us tell you more about how Bucyrus-Erie electric excavators can help you reach higher production goals — economically.

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Books for Coal Men

Highwall Augering

The Use of Augers in Surface Mining of Bituminous Coal, by W. A. Haley and J. J. Dowd describes how coal augers are used to mine bituminous coal near the outcrop and provides production information on eight different installations. Diameters of holes ranged from 26 to 52 in and depths varied up to 208 ft. R. I. 5325. *22 pp. 8x10½-in; paper. Bureau of Mines, Publications-Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Corrosion

Corrosion: a Compilation, by Dr. M. G. Fontana. This work is a compilation of monthly articles written during the past 10 yr for Industrial and Engineering Chemistry and is divided into seven chapters. The book may be used as an aid to plant men or as a reference text. *Hollenback Press, Columbus, Ohio.*

Pennsylvania Minerals

Historical Statistics of Pennsylvania's Mineral Industries, 1739-1955, by Dr. J. J. Schanz, Jr. This bulletin includes facts on the relationship of reserves to production and consumption and is designed to provide a basis for planning mineral utilization. It also enlarges and brings up to date **Pennsylvania's Mineral Heritage,** published in 1944. *Bulletin No. 69, Mineral Industries Experiment Station, The Pennsylvania State University, University Park, Pa.*

Industrial Water

Manual on Industrial Water, prepared by ASTM Committee D-19, is a brief reference source for the following three groups: executives and plant designers; individuals engaged in industrial operations using water; and analysts, operators of special instruments, engineers and consultants. Subjects discussed include difficulties caused by water in industry, composition of water and water-formed deposits, treatment, sampling and analysis of industrial water. *490 pp. 6⅝x9-in; cloth. $6; $4.50 to members, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.*

Ohio Coal Resources

Coal Resources of the Lower Part of the Allegheny Formation in Ohio, by R. M. DeLong is devoted chiefly to the Brookville No. 4 and Clarion No. 4A coals, but also includes the Ogan, Winters, Scrubgrass and Lawrence beds. *50¢. R. I. No. 31. Ohio Division of Geological Survey, Orton Hall, The Ohio State University, Columbus 10, Ohio.*

Employee Relations

Satisfying the Salaried Employee is a practical manual for building better relations with white collar workers. The study, made by the National Association of Manufacturers, covers four areas which the NAM says holds the answer to job satisfaction: status and recognition, compensation, communication, and supervision. *64 pp. 5⅝x8⅝-in; paper. 50¢, National Association of Manufacturers, 2 East 48th St., New York 17, N. Y.*

Russian Coal Industry

The Coal Industry of the USSR is a report on the observations made by a technical team from England's National Coal Board while visiting Soviet coal mines. The report covers observations in the Kuzbass, Donbass and Rostov coalfields and information given by officials of the industry. Subjects included are production, mining methods, planning, mechanization, roof support, transportation, engineering, wages and research. *107 pp. plus map. 6x9⅝-in; paper. 7s 6d, National Coal Board, Hobart House, Grosvenor Place, London, S. W. 1, England.*

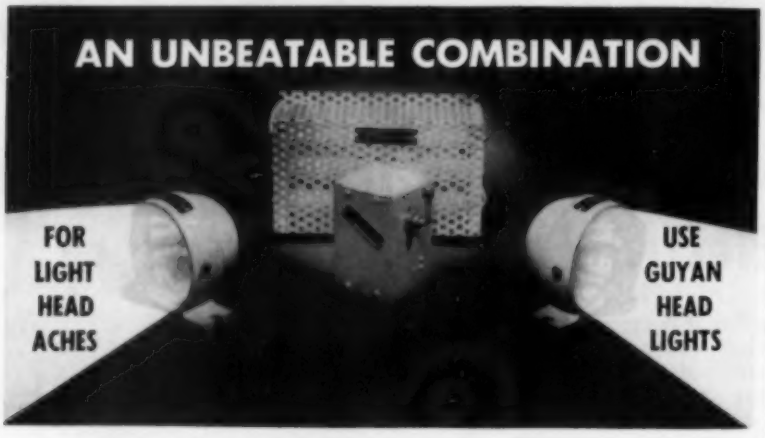
Coal Technology

Coal Science, by D. W. Van Krevelen and J. Schuyer. This work is a modern treatment of the problems of the constitution and properties of coal, based on recent developments in fundamental research. It is divided into three parts. Part I deals with coal in its various aspects and includes coal as a fuel and basic material; coal as an organic sediment; coal as a rock; coal as plant debris; as a physical system. Part II discusses the constitution of the coal matrix, including physical and chemical constitution analyses, the polymeric character and the composition of coal. Part III covers the principal plysical and chemical properties, with chapters on electrical and magnetic properties, mechanical properties, thermal properties, behavior on heating, and behavior toward molecular oxygen. *352 pp. 6x9-in; cloth. $9.50, D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N. J.*

Safety

Five Minute Safety Talks for Foremen, by R. F. Blake contains 52 talks on accident prevention. Each talk comes with an outline and text suitable for either informal or scheduled training sessions. *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

Radio Frequency Energy—a Potential Hazard in the Use and Transportation of Electric Blasting Caps explains the potential hazard of RF energy to electric blasting and offers precautions designed to minimize it. *9 pp. 4⅝x6⅜-in; paper. Free, Institute of Makers of Explosives, 250 East 43rd St., New York 17, N. Y.*



GUYAN SEALED BEAM HEADLIGHTS

PAR-46 Sealed Beam bulb with either 6, 32, 115 lamp voltage, encased in steel

GUYAN HEADLIGHT RESISTORS

Custom Designed, operates on 250, 300 or other voltage for longest life

GUYAN MERCURY TUBE HEADLIGHT SWITCH

With extra capacity, contols your light requirements for safest operation

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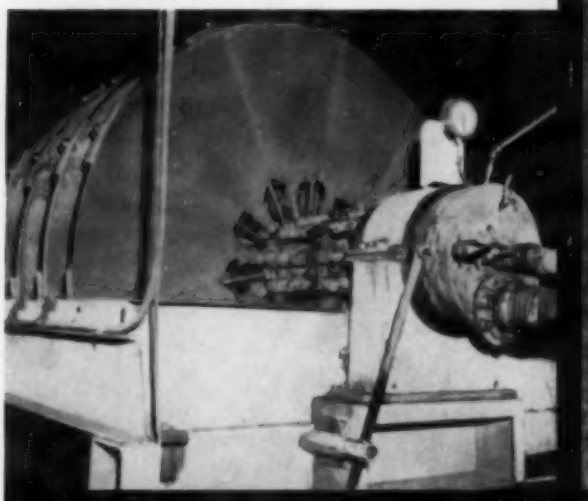
How Dorr-Oliver

THICKENER – FILTER – PUMP TEAM

Recovers fine coal at
Buckeye Coal & Coke Company...
Washery process water clarified for reuse



6' dia. x 5 disc American Filter — valve end.

35' dia. Dorr Type A Thickener at Buckeye Coal & Coke Co.

By the installation of a fine coal recovery system in the coal washery plant, the Buckeye Coal & Coke Company, at their Stephenson, West Virginia Plant is now recovering 65 TPD of minus 18 mesh coal previously lost in plant effluent to the Guyandotte River.

Essentially the system consists of a 35-foot diameter Dorr Type A Thickener and a 6-foot diameter by 5 disc American Filter. Thickener underflow is handled by a No. 4 Oliver Diaphragm Slurry Pump; other D-O auxiliary equipment includes two Oliver Type L Centrifugal Pumps.

Here's how it works. Drag tank overflow combined with centrifugal dryer effluent containing 4.5 TPH of minus 18 mesh coal is laundered to the Dorr Thickener. Underflow, concentrated to 40% solids, is then fed to the American Filter where the 65 tons of dewatered fine coal is recovered each day. Thickener overflow containing less than 1,000 ppm solids is recycled to head tank for reuse in washery. Filtrate is recycled to the Thickener.

If you have a problem in the recovery of fine coal, such as existed at Buckeye, Dorr-Oliver engineers can be of help to you. For complete information, write Dorr-Oliver Incorporated, Stamford, Connecticut.

American, T.M. Reg. U. S. Pat. Off.

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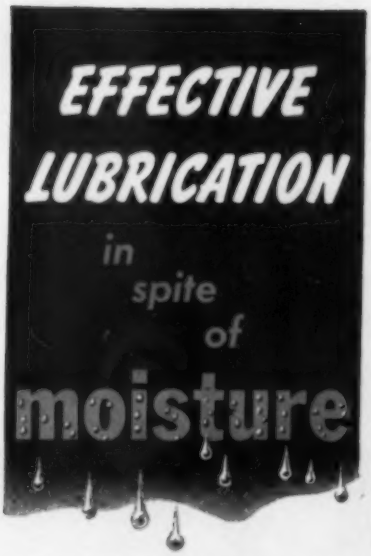


LUBRIPLATE 130-AA

affords machine parts and bearings real protection against rust and corrosion. It is a grease type lubricant that possesses the utmost in water and acid resistance. It has exceedingly high film strength. Due to the marked adhesiveness and water resistance of LUBRIPLATE 130-AA, it does not wash off readily, hence is the ideal lubricant in the presence of moisture.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK". . . a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

Personal Notes

N. T. Camicia

Island Creek Executive

N. T. Camicia was elected vice president and general manager, operations, of the Island Creek Coal Co. Mr. Camicia, a resident of Holden, W. Va., leaves a position as the company's general manager of mines to assume the duties of his new post.

During his career with Island Creek Mr. Camicia has been associated in executive and operational capacities with the company's Bartley, Marianna, and Holden, W. Va., operations. In his most recent job as general manager of all Island Creek mines his duties included operational direction of mines in Virginia and eastern Kentucky.

A West Virginian by birth, Mr. Camicia is a graduate of Virginia Polytechnic Institute and holds a degree in mining engineering. He joined Island Creek immediately after graduation in 1938 and has served with the company since, except during military absences.

During World War II he entered Holland in 1944 with combat troops during Holland's liberation. He remained to rehabilitate and operate the Dutch State coal mines.

Mr. Camicia is a member of the National Management Association, the West Virginia Coal Mining Institute, the American Management Association, and the National Mine Rescue Association.

Diamond Heads Engineers

A few days after the announcement last month that N. T. Camicia had been elected vice president and general manager of operations (story above), Island Creek Coal Co. disclosed it was streamlining its engineering departments because of complex mechanization, automation, and company growth. The result, said Island Creek, would mean a consolidated Engineering Dept.

For a number of Island Creek's top operating men the streamlining meant promotions, advancements, and responsability shifts.

For **W. F. Diamond**, onetime chief engineer and later assistant to the company's engineering vice president, the move meant being served up the title of manager of engineering and the responsibility of being top engineering executive of Island Creek's operating department.

W. F. Diamond

S. M. Dameron

Other high level operating men were affected this way:

S. M. Dameron, head of the company's Maintenance Dept., was named to assist Mr. Diamond. Associated with Island Creek for 25 yr, Mr. Dameron was assigned the job of supervising activities within the newly consolidated Engineering Dept. headed by Mr. Diamond. At the same time Mr. Dameron's Maintenance Dept was merged with the Construction Dept. to form the new Maintenance and Construction Engineering Section. Construction's old head, **Roscoe Garrett**, a 45-year Island Creek man, was named superintendent of the dual-role section.

In still other moves:

L. D. Ellison, an Island Creek employee for 20 yr, was put in charge

A new O-B Cable Fault Locator!

(in a light-weight, rugged, "pocket-size" package)

Here's the simplest, lightest, most inexpensive, and easiest to use cable fault locator ever offered for mine service!

Designed to pinpoint both short and open circuits in trailing cables having two or more conductors — powerful enough to test cables up to 600 feet long! Complete "pocket-size" package consists of four small, extremely rugged elements which are shipped from the factory — and carried around the mine — in the handy canvas bag shown above.

To operate, simply connect battery and signal generator (about the size of a flashlight) to power end of cable and then move along cable with receiver and headphones as shown above.

Headphones and rugged, all-transistor receiver are only parts carried along cable!

Weighs under four pounds, costs less than any cable you'll use it on!

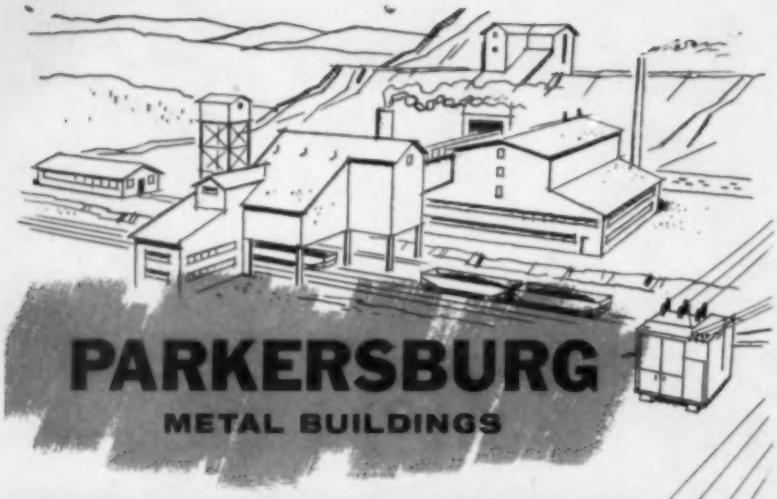
Write for more information now on the O-B Cable Fault Locator, Cat. No. 22567.

4811-M

Ohio Brass

MANSFIELD OHIO, U. S. A.

IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.



. . . here's portable and permanent housing

There is a double utility in pre-engineered, quality Parkersburg metal buildings that spells real operating economies in the field. They serve as permanent structures or can be disassembled and moved to other sites. Ranging in size from small tool sheds to large factory-size structures these metal buildings look better, perform better and last longer because they represent the very finest quality obtainable anywhere today. For further information write Department J-2

60 Years of Successful Service!

THE PARKERSBURG RIG AND REEL COMPANY
Division of Parkersburg-Aetna Corporation
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BUILDING
PARKERSBURG
DIVISION

Authorized Sales Representatives and Dealer Erectors in Major Cities

"WISE IN THE WAYS OF METAL BUILDINGS"

Personal Notes *(Continued)*

of the Engineering Dept.'s Mining Engineering Section as chief mining engineer.

L. Y. James, chief design engineer, was charged with heading the Design Section.

John Dunn, chief electrical engineer, was named to head the Electrical Section.

Earl Boggs was continued as chief project engineer; **Ray Taliaferro** was continued as assistant chief mining engineer; and **R. D. Herron,** was named to assist Maintenance and Construction head Garett.

Roy E. Dean, assistant to the president of Ayrshire Collieries Corp., and vice president and director of the Frontenac Coal Corp. was elected a member of the board of directors, Bituminous Coal Research, Inc. Among other posts held by Mr. Dean are president and director of the Indiana Coal Association; member of the Coal Economics Committee, National Coal Association. Mr. Dean is 35 yr old and is a resident of Indianapolis, Ind.

William H. Lesser, Scranton, Pa., was presented with an Alumni Association Award by Lehigh University alumni. Mr. Lesser, a consulting engineer for Pierce Management, Inc., was cited "in recognition of his pioneering as a mechanical-electrical engineer in the electrification of coal mines, in the development of the sand-flotation processes for beneficiating anthracite, and in the development of mines in Greece and Mexico." The award is the highest that can be bestowed by the Lehigh alumni. Its bestowal was based on "distinguished personal achievement and service" bringing credit to Mr. Lesser and to Lehigh University.

Julius C. Olzer, former West Virginia mines chief, joined Hanna Coal Co. as director of safety and training at the company's Ireland mile, Cresap, W. Va. Mr. Olzer, who was succeeded in his state job by **Crawford L. Wilson,** moved into the new post in early June. Mr. Wilson had been safety director for the New River & Pocahontas Consolidated Coal Co. in West Virginia's McDowell County.

George Rollins, treasurer of the Kemmerer Coal Co. of Kemmerer, Wyo., resigned to take a post with Thiokol Chemical Corp. in Brigham City, Utah. Mr. Rollins had been with Kemmerer Coal Co. since Sept 1, 1953. President **Glenn Sorenson** said no replacement has been named yet to succeed Mr. Rollins.

Donald H. Bonin was appointed fuel service engineer in the Coal Div., Eastern Gas & Fuel Associates. Mr. Bonin will work with **R. I. Bush,** combustion engineer, in Pittsburgh. He joins Eastern after leaving U. S. Steel.

O'Donnell Iselin, grandson of the founder of the Rochester & Pittsburgh

1800-ft. mother conveyor in Donegan's H Mine uses a 30-in. neoprene belt

Why Donegan uses neoprene conveyor belting

Donegan Coal and Coke Co. uses belt conveyor systems in its drift mines at Richwood, West Virginia. Much of the belting now in service is neoprene, and Donegan plans to standardize on neoprene belting because it offers more than flame resistance. Neoprene's balanced combination of properties means long-term economy.

Neoprene covers have excellent resistance to abrasion, cutting and chipping, which gives long-term protection of the body fabric from deterioration by mildew, acid mine water and load abrasion. Neoprene's resistance to aging and softening by contact with oil and grease further insures long belt life. When used on the surface, neoprene's resistance to sunlight and weathering is an important advantage. All of these properties mean long-term economy in any mine.

Next time you replace your conveyor belting or buy a new conveyor, be sure to specify neoprene. Its outstanding resistance to oil and grease, abrasion, aging and fire will save you money.

For information about neoprene, ask us for the Elastomers Notebook. Just write to E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department CO-7, Wilmington 98, Delaware.

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Better Things for Better Living
. . . through Chemistry

NEOPRENE
made by Du Pont for 25 years

MORE COAL YOUR GOAL?

Specify Hendrick Flanged Lip Screens

Vibrating screens that blind too often can knock a big hole in production schedules. But here's an easy out . . . try a Hendrick Flanged Lip Screen!

Hendrick screens provide better separation and practically eliminate costly delays caused by blinding. Ideal for shaking and gravity screens and discharge chutes. Flanged Lip Screens are furnished with openings from .010 x .025 x ½ (equivalent to 1/32" Round) to 10-½ x 11-½ x 13 (equivalent to 16" Round).

Hendrick MANUFACTURING COMPANY

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring — Shur-Site Treads • Armogrids • Hydro Dehazers • Petrochemical Column Internals

41 Dundaff Street Carbondale, Pa.

How deep is the overburden?

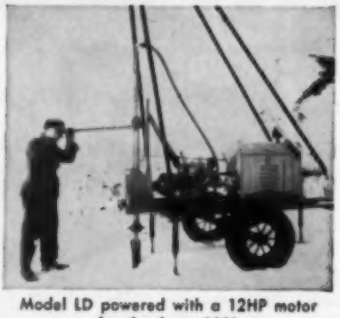
Why guess when these low-cost, easy to operate Acker LD Core Drills tell you

Quickly!

Easily!

Inexpensively!

1. Quality of Coal
2. Thickness of Seam
3. Depth of Overburden



Model LD powered with a 12HP motor for depths to 300'.

Model LD powered with a 7HP motor for depths up to 150'.

For simplicity of design and operation you just can't beat the Acker LD. We've kept moving parts to a minimum and eliminated all feed gears or screws. (Elimination of unnecessary parts cuts down weight, too—an advantage when operating in isolated locations.)

Our newly designed double tube core barrel retrieves samples even where others fail!

Your choice of power and mounting.

Write today for prices and Bulletin 21 CA

ACKER DRILL CO., INC.
SCRANTON 3, PA.

Personal Notes (*Continued*)

Coal Co., Indiana, Pa., was elected chairman of the board at a recent meeting. He leaves the posts of director and secretary of the company, which he had held since 1928. He is succeeded there by his son, **Peter Iselin.**

Joseph B. Taggart was elected president and chief executive officers of the Wise Coal & Coke Co., Dorchester, Va. Mr. Taggart was formerly vice president in charge of operations.

Dr. Howard L. Hartman was named professor and head of the Dept. of Mining, Pennsylvania State University. The appointment was effective July 1. Before the appointment Dr. Hartman was acting head of the Dept. of Mining Engineering at the Colorado School of Mines. From 1947 to 1948 he was a Penn State faculty member.

Dennis J. Keenan, Spangler, Pa., was promoted to vice president in charge of operations for the Sterling Coal Co., Philadelphia, Pa. Mr. Keenan had been general superintendent before the promotion.

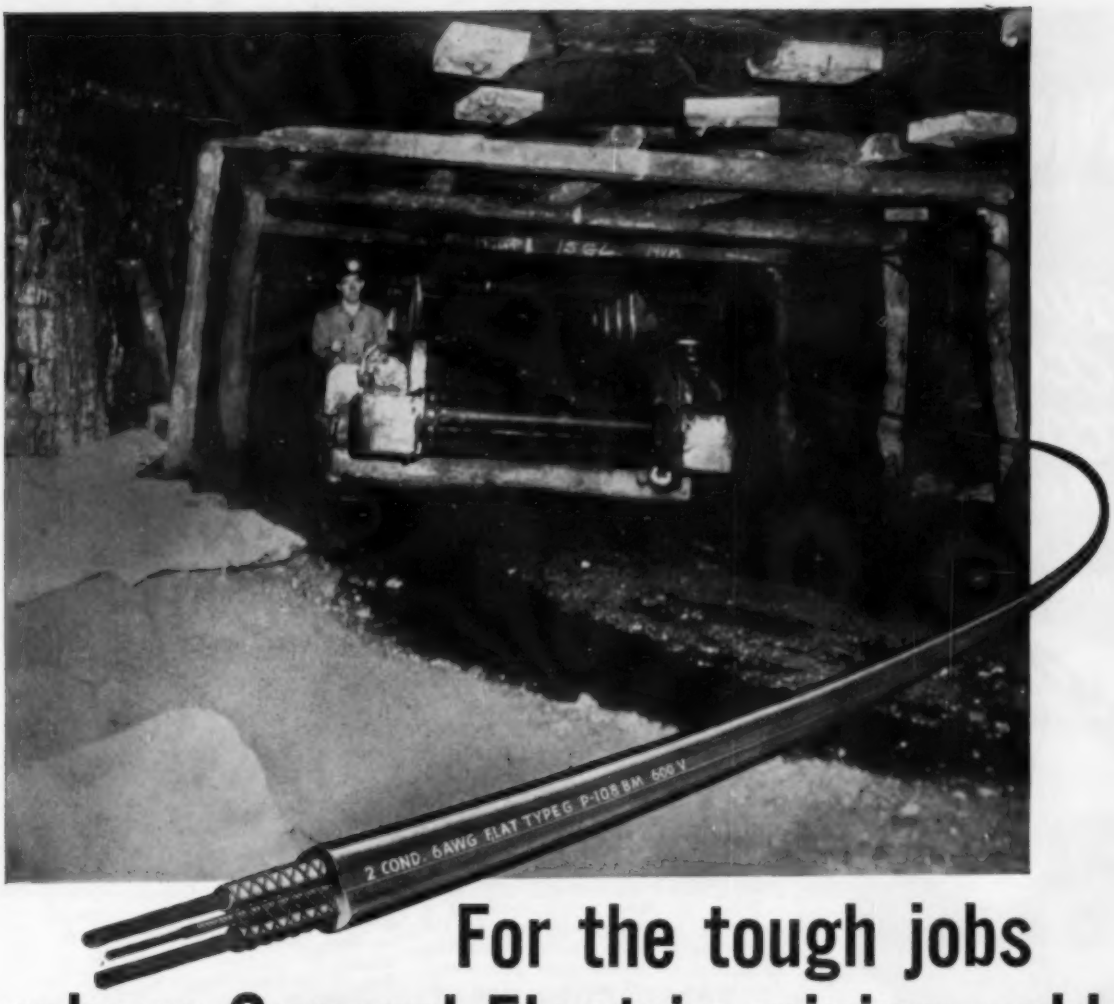
Obituaries

Charles H. J. Patterson, vice president and director of engineering of the McNally Pittsburg Mfg. Corp., Pittsburg, Pa., died May 25. He was 60. Born May 9, 1897 in Massachusetts, Mr. Patterson spent most of his youth in Waverly, Ohio. After World War I he was graduated from Catholic University, Washington, D.C. He worked in Welch, W. Va., as a consulting engineer, and for some time had been resident engineer for the Henry Ford Coal Mines in Welch. Later he became chief engineer of the American Coal Cleaning Corp.

Frank Cartlidge, for 28 yr a design engineer for Goodman Mfg. Co., Chicago, Ill., died May 28 at the age of 82. Mr. Cartlidge, since the age of 13, had followed a career in mining. His associations included the Frank Prox Co.; the Sullivan Machinery Co., where he helped develop the first successful shortwall and track mounted cutting machines; and the Cincinnati Mine Machinery Co., which he organized early in the 1920's.

Charles G. Schantz, Sr., director of Research for Weston Dodson & Co., Inc., died May 19 in Bethlehem, Pa. Mr. Schantz had been associated with the company for 38 yr.

Henry R. Venters, 58, superintendent of the Lillybrook Coal Co.'s mine at Affinity, Raleigh County, W. Va., died May 20. A native of Scotland, Mr. Venters came to America as a youth. He began working for Lillybrook in 1937. A former superintendent of the Kilarney, Raleigh County mine, Mr. Venters was appointed to direct the Affinity operation in 1955.



For the tough jobs rely on General Electric mining cables

Jagged rocks, moisture, even chemicals, constantly attack mining cable. In addition, cable may be crushed under heavy equipment, bent, or twisted. For severe conditions like these, it pays to rely on sturdy and resilient General Electric mining cable. These types have proved their outstanding performance on tough jobs:

Mining Machine Cable, Types W and G—Designed for especially severe conditions, such as being dragged behind mining machines, hit by picks, run over by equipment. Is exceptionally flexible, resilient, and abrasion-resistant.

CordX*—A heavy-duty, flexible cord for use on portable electrical equipment where severe usage is encountered and where exceptional mechanical, moisture, heat, and chemical resistance is required. Has U. S. Bureau of Mines marking.

Borehole Cable—A steel-armored cable with extra tensile strength for vertical suspension, either varnished-cambric- or rubber-insulated.

Mine Power Cable—A nonmetallic-sheathed cable for primary distribution to load centers. For use in haulageways, in airshafts, suspended from roof supports, or in boreholes.

FOR FULL INFORMATION on how G-E wire and cable can improve your distribution system, call your General Electric representative or write Section W216-714, Wire and Cable Department, General Electric Company, Bridgeport 2, Connecticut.

*Registered Trade-mark General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

PENN PARTS
Set the standard for
QUALITY
ACCURACY
ECONOMY
IN REPLACEMENT PARTS FOR MINING MACHINERY

For more than 30 years, Penn Machine gears, shafts, sprockets, bronze castings and specially designed parts have been meeting the most exacting requirements of the mining industry. Daily shipments of dependable parts from strategically located inventories by air, rail, motor freight and our own trucks, help you minimize costly downtime.

WRITE TODAY FOR BROCHURE!

PENN MACHINE CO.
JOHNSTOWN, PA.
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Among the Manufacturers

CABLE PLANT occupied by Okonite Co. covers 446,000 sq ft on 160-acre site in North Brunswick, N.J. Plant was originally built as a Studebaker assembly operation, but was never used. Okonite bought structure, then revamped it to handle heavy processing and manufacturing.

This was the news:

From Cars to Cables

The Okonite Co. opened the doors of its new $4.2 million plant in North Brunswick, N. J. for a look by business publication editors and publishers.

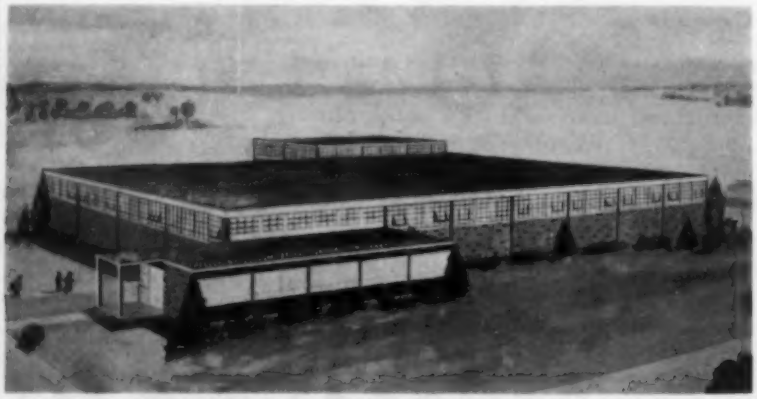
What the press people saw was a sprawling, but integrated plant for the production of cable. Inside, in addition to machinery the company had moved from its defunct Wilkes-Barre plant, were new machines and equipment that had cost Okonite $2 million. The building itself, originally built to make Studebaker car parts, had been redesigned in a number of areas to accomodate the special needs of Okonite (e.g. a 20,000-gal water tank into which reels of electrical cable are soaked for 8 hr or more then subjected to tests from equipment delivering 78,000 v).

In its move from Wilkes-Barre, Pa., Okonite, according to its officials, brought along 68.7% of its personnel or 375 employes. Okonite made its decision to move 2 yr ago when it began studies to establish new plant requirements. Acquisition of the unused Studebaker plant was unexpected and hastened the move from Wilkes-Barre. The plant is situated in New Jersey on U. S. Highway 1 where the highway crosses the main line of the Pennsylvania RR from New York to Philadelphia. The original plant covered 420,000 sq ft, plus 9,600 sq ft of office space. Okonite added 16,000 sq ft of its own before moving in.

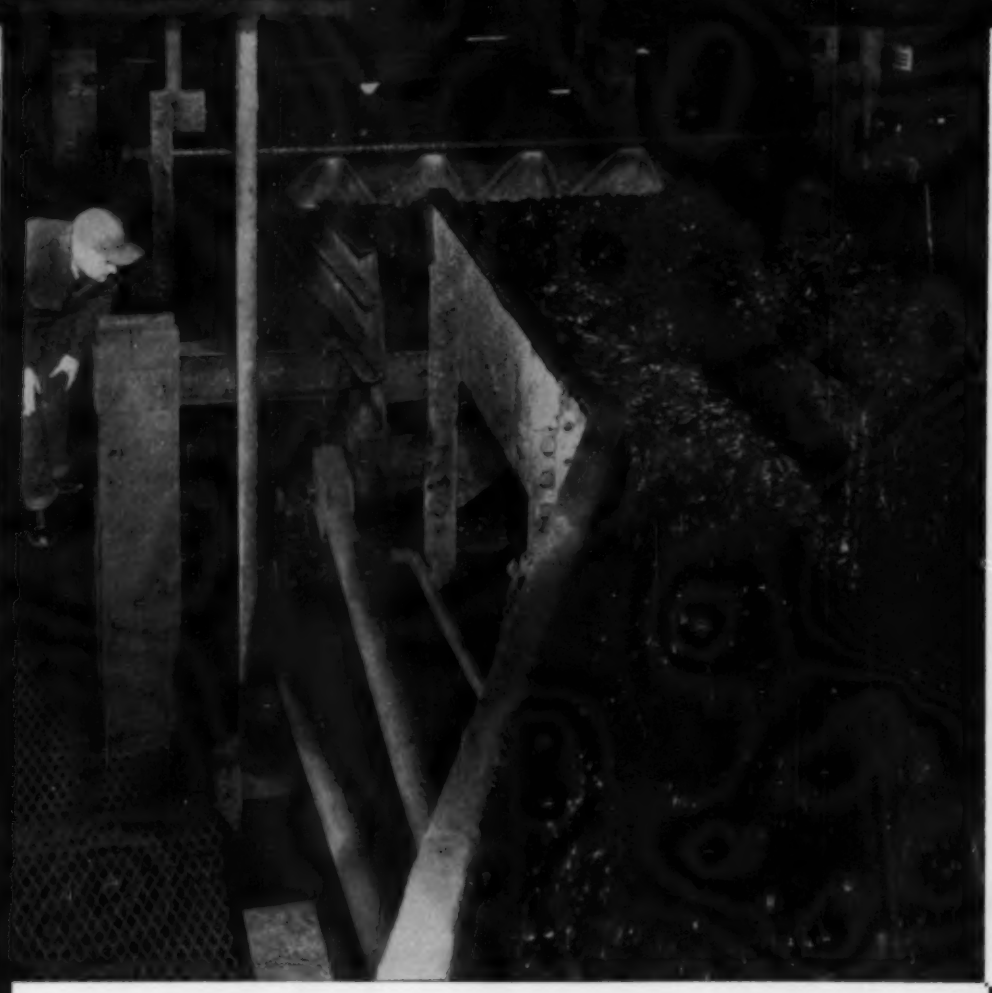
Full-Time Tool Making

The Carmet Div., Allegheny Ludlum Steel Corp., began operating full time

(Continued)



MINING TOOL PLANT—Mining tools and standard lathe tools of cemented carbides are being produced at the new Bad Axe, Mich., plant of the Carmet Div., Allegheny Ludlum Steel Corp. Full operation began July 1.



Triple-deck dewatering and sizing machine in action. Stainless Steel screen is bottom deck.

Closeup of Stainless Steel screen. There is no sign of blinding.

Stainless Steel screen eliminates blinding at W. P. Stahlman Co., Corsica, Pa.

W. P. Stahlman operates large stripping mines near Corsica, Pa. The coal is trucked to a nearby cleaning plant where it is crushed, cleaned and sized.

Recently, they installed a Stainless Steel deck in a triple-deck dewatering and sizing screen to replace a carbon steel screen that failed after about eight months of service. Failure occurred where the very high-pressure water hit the screen. The old screen blinded, and prevented undersize coal from falling through.

The operators report vastly improved performance with the new Stainless Steel screen because the end product is better and more uniform in size.

If you keep careful tonnage records, you'll find that Stainless Steel screens and chutes are almost always the cheapest that you can buy . . . in terms of cost per ton of processed coal. For more information on reducing costs, write for "More Output in Preparation Plants . . . " and for our booklets on Stainless Steel in the Sunnyhill and the new Corbin plant. Address: United States Steel, Room 2801, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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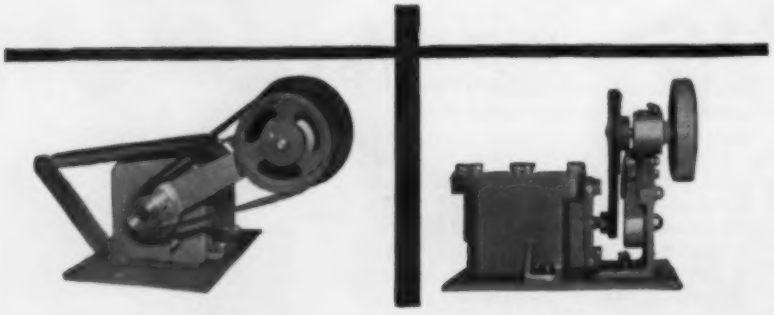
SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

UNITED STATES STEEL

"Watchdog" of your Conveyor System

ENSIGN Centrifugal Switches protect your belt conveyors against fire due to slippage on the pulleys. The switch, when used with a time delay, such as an Agastat, will automatically shut off motor when normal speed of belt conveyor is reduced due to interference.

• • • Saves replacement of expensive belting • • • prevents loss of tonnage due to down time • • • eliminates the hazard of fires • • • provides greater safety to workers • • • can be used for sequence operation of multiple belt system • • • operates forward or reverse direction.



Bulletin 1100
(Dust-tight)

Bulletin 1101
(Explosion-tested)

ENSIGN
ELECTRIC AND MANUFACTURING CO.

914 Adams Avenue — Huntington 4, West Va.

Manufacturer (*Continued*)

its new carbide tool-making plant in Bad Axe, Mich.

The plant, which opened May 15, began full time production July 1. The company, which markets a line of coal mining tools, began an expansion of mining tool production in 1955. The Bad Axe plant is the newest move in that expansion. The resident manager of the Bad Axe plant is **George L. Bussa.** Bad Axe, itself, is situated about 100 mi north of Detroit and is the country seat of Huron County. The plant site is served by the Chesapeake & Ohio RR.

Gulf Oil Corp. opened three new laboratories at its 53-acre research center near Harmarville, Pa.

The new laboratories are the William Larimer Mellon Production Research Laboratory and Drilling Building, where drilling and oil production methods will be investigated; the Richard Beatty Mellon Automotive Products Laboratory, where fuels and lubricants will be tested; and the Andrew William Mellon Nuclear Science Laboratory, where the use of nuclear energy in the petroleum industry will be studied.

Hewitt-Robins, Inc., disclosed plans to construct a plant in King-of-Prussia, Pa., to produce industrial wire cloth and wire mesh conveyors.

The disclosure was made by H. E. Kleintop, manager of the company's subsidiary, Korb-Pettit Wire Fabrics & Iron Works, Inc. The plant is being built to replace facilities now in Philadelphia. Occupancy is expected, the company says, by September 1.

Joseph T. Ryerson & Son, Inc., announced a plan to expand its Pittsburgh, Pa., steel service plant.

Capacity is expected to increase by one-third as a result. The cost is estimated by the company at $1 million, the occupancy date—estimated to be sometime in 1958. The new space will be used principally to house larger stocks of structural, plate, bar, and sheet steels.

Thew Shovel announced it will manufacture a line of rubber tire-equipped front end loaders named "Moto-Loaders.

The company, a manufacturer of power shovels and cranes, began producing the loaders late last month in limited quantities. Available thus far are a 1/2-yd model and a 1 3/4-yd model. The development of additional models is expected soon.

Samuel R. Parry was elected vice president of Combustion Engineering, Inc.

Mr. Parry joined Combustion in 1923 as a cooperative student. In addition to his new duties he will continue as general manager of the company's Chattanooga Div.

PHOTO COURTESY GOODMAN MANUFACTURING COMPANY

WHY SETTLE FOR LESS, WHEN ANACONDA 50% GROUNDING WIRE INSURES

Greater electrical protection at no extra cost

New flat stranding of grounding conductor prevents broken wires—assures continuity of operation. Full 50% wire delivers peak electrical protection.

It takes a full 50% grounding wire to give you needed electrical protection. Anaconda's service-proven, *flat* grounding wire provides this protection, yet, because of its unique construction, allows more cable on reel. Flat 50% wire, too, offers extra safeguard . . . will not cut insulation if cable is crushed by runovers.

Millions of feet of Anaconda Securityflex* Shuttle Car Cable have been sold without a reported failure of grounding conductor. In addition, Securityflex offers . . .

3 NEW ADVANTAGES

1. Rugged high-grade *neoprene insulation* that greatly increases resistance to puncture, flame and crushing.
2. Improved stranding of ground and power conductors that prevents broken wires — assures continuity of ground.
3. Nylon breaker strip that increases short-circuit protection . . . and nylon jacket reinforcement that adds to cable strength and prevents wicking of moisture.

Insist on full-size grounding conductor for safety — insist on *Anaconda* Shuttle Car Cable. At *regular* prices. See the Man from Anaconda or your distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. 57220

*Reg. U.S. Pat. Off.

ASK YOUR ANACONDA® DISTRIBUTOR FOR MINE CABLE

Mine Inspectors (from p 94)

failure to clear right-of-way with dispatcher and coupling cars in motion.

Turning to a special problem in Kentucky, Mr. Vines reported that "homemade" shuttle cars are becoming more numerous. These cars are makeshift masterpieces for getting coal into the bin, but are sadly lacking in sound safety engineering design. The state department of mines has undertaken to solve this problem at its source by visiting the shops where such cars are made and offering suggestions and construction standards. The cars are usually built upon a used truck chassis and transmission, and often with nothing more than a belt-linked reversible motor for a brake. Lighting is poor and electrical bonding of components is lacking. Take-up reels are not provided and cables are backlashed and dragged in both directions. It is estimated that more than 400 of these cars are in operation in eastern Kentucky now. Last year two drivers were killed on these cars and one man was killed while operating a home-made rubber-tired locomotive.

Parmanco

H-81-53

HORIZONTAL DRILL

Completely Re-designed

- *with hydraulic feed*
- *horse power increased to 81 with "223" cubic inch engine*

Included in the new design is a sturdier frame, with the elimination of racks, pinions, and all mechanical power feed gearing. The four individually adjustable jacks make possible faster set-up and smoother drilling.

Easily cuts drilling time IN HALF

The H-81-53 drill is designed for drilling 5-6-8 inch holes to 100 feet or more. The greatly increased 81 h.p. engine in combination with the hydraulic feed makes possible the reduction of footage time by at least one half. All drive gears are totally enclosed. Power feed features direct hydraulic feed eliminating reduction gearing in hydraulic feed system.

This new drill—the very latest in design—is equipped with self-starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes, and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling.

• *SEND FOR COMPLETE DETAILS*

PARIS MANUFACTURING CO. PARIS, ILLINOIS

Progress Through Training

Taking up the matter of safety organization and training, Mr. Gibson noted that safety departments within producing companies are becoming more important and more highly respected and that the men in these departments have well defined staff responsibilities.

Another forward step, Mr. Gibson said, is the willingess of companies to open their accident-record books to other companies in order that each might profit by the exchange of information. In eastern Ohio, safety directors organization exists which holds monthly meetings for discussing the accidents in the area and striving to bring about solutions. The organization cooperates with the UMWA and all other agencies promoting mine safety in Ohio.

There is also the emergence of a new type foreman. Today, he should be among other things a leader of men, a counselor, a safety engineer, a machinery specialist, a diplomat, an efficiency expert, a lawyer and, not least of all, a salesman. It is through all these qualities that he functions as a safety teacher and leader.

On attitudes existing between management and labor, Mr. Gibson said there may be some finger pointing by labor at management, but where the shoe fits management should wear it and get its house in order. By the same token, labor will also get its house in order when management is justified in pointing to local unions or individuals who are capricious and evidence no desire to cooperate on safety. Here again, attitudes have changed remarkably in the past few years, Mr. Gibson said.

Safety can be sold in other ways, including sincere consultation with the mine safety committee, taking an interest in high-school youth who show an inclination toward a mining career and bringing the families of employees into the picture as helpful assistants in getting the safety message across.

National Campaign

Unqualified support of the UMWA in the national campaign to prevent roof-fall accidents (see p 64 in this issue of *Coal Age*) was voiced by Mr. Ferguson in presenting a paper jointly authored by Mr. Grieve. Mr. Ferguson brought out that the international officers are solidly backing the program and will take all steps to insure the full cooperation of the membership of the union. The goal is to effect a 50% reduction of the roof-fall toll in the year ending June 30, 1958, through a non-competitive campaign. Each mine participating in the campaign competes only against its own record for the previous year or two.

Closing feature of the session was a new U. S. Steel motion picture, entitled, "Knowing's Not Enough", which was introduced by Mr. Sambrook. Prints of the film may be borrowed or purchased at cost from U. S. Steel by organizations which maintain film libraries. The film and title are basis for an energetic safety campaign throughout U. S. Steel

Here's MORE efficient driver speed for HEAVY Loads

ALLIS-CHALMERS TEFC Wound-Rotor MOTORS

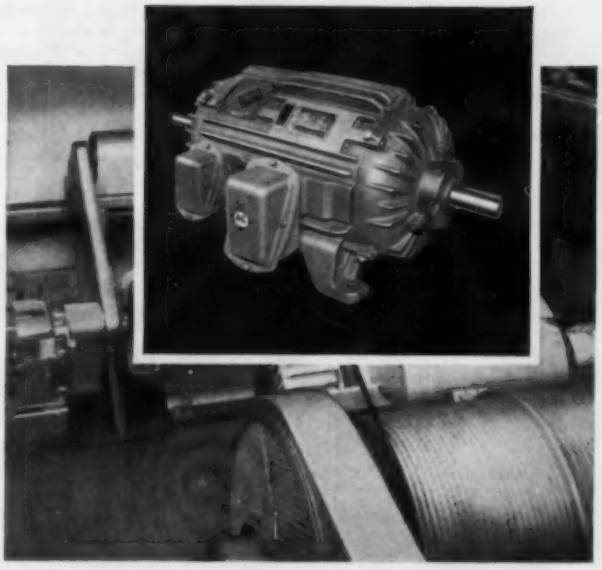
Where high inertia loads must be accelerated quickly and smoothly — yet power supply is limited — the Allis-Chalmers wound-rotor motor proves its efficiency . . .

High starting torque with this motor requires relatively low line-current. In addition, adjustable acceleration and running speed are possible through use of simple controls.

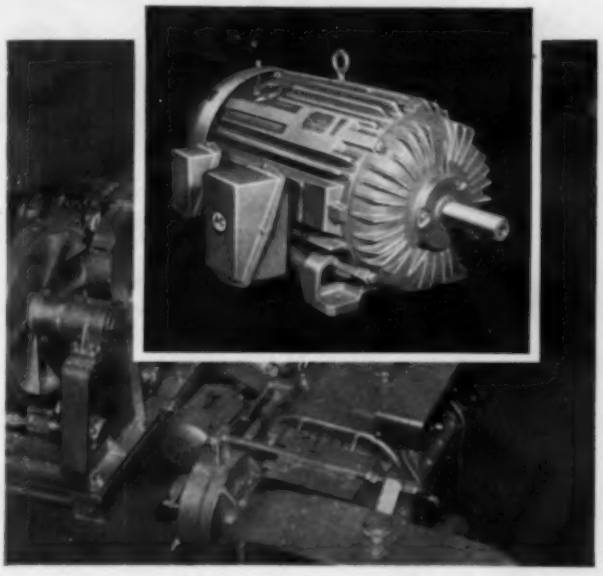
Other features of the TEFC wound-rotor motor include:

1. **Rib construction** provides ample cooling surface.
2. **Single enclosure** surrounds stator, rotor, slip rings, brushes and brush rigging. Gives maximum protection in moist, dirty, corrosive or hazardous atmosphere.
3. **Cast-iron frame** contributes rigid, distortion-free bearing support and keeps alignment true.
4. **Easy access** to collector rings and brushes permits on-the-spot inspection of brushes and commutators.

If you use hoists, lifts, cranes, conveyors, crushers or mills, find out more about the "MORE" in Allis-Chalmers wound-rotor motors. A-C motors also are available in various open types. Contact your nearby A-C sales office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.



For intermittent duty, this totally-enclosed, non-ventilated model is available in frame sizes 284 to 505 inclusive. Above 505 frame, Allis-Chalmers offers its famous tube-type motor.



For continuous service, this tough, fan-cooled model is ideal. All enclosed motors can be furnished in standard enclosed or explosion-proof construction rated 55 C rise.

A-5180

ALLIS-CHALMERS

Mine Inspectors *(Continued)*

plants, designed to stress the point that it is one thing to know how to work safely, it is another to apply the knowledge.

The final session on Wednesday afternoon was devoted to the subjects of improved ventilation and dust control for continuous mining and the potential value of legal procedures in emphasizing the employee's responsibility for safety. Speakers were: J. E. Elkin, general superintendent, coal dept., Duquesne Light Co., Pittsburgh, Pa.; T. L. Garwood, mining engineer, Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill.; Murrell Reak, assistant director, Illinois Dept. of Mines & Minerals, Springfield, Ill., and George A. Brecker, chief safety engineer, Reading Anthracite Co., Pottsville, Pa.

Auxiliary Blowers

Recent improvement at Duquesne Light's Warwick mine at Greensboro, Pa., in the use of carefully-supervised auxiliary blowers and simplified dust collectors for roof bolting with continuous mining, were described by Mr. Elkin in a slide-illustrated presentation. In the first installation of an auxiliary blower, a low pressure Jeffrey Aerodyne fan had been used, but two new units are equipped with 18-in Jeffrey Aerodyne Midget high-pressure fans with 10-hp motors.

The fan is installed in the face crosscut with the electrical components on intake air and the discharge passing through a brattice in the breakthrough. A by-pass arrangement has been built into the brattice alongside the fan to permit excess air, above and beyond the quantity moved by the fan, to pass through the brattice.

Advantages of these installations at Warwick are better visibility and better ventilation at the face. Flexible tubing, with rock dust placed in each section, is hung from the fan to the immediate face area to exhaust from the face. More rock dust is thrown in the returns to neutralize any dust which is removed by the fan.

Continuous miners at Warwick are equipped with their own roof bolting drills. A special bucket which may be mounted on the drilling auger and held tightly against the roof have been developed at the mine. Dust from the roof-drilling operation falls by gravity into the bucket which may be easily emptied. The units are self contained and have no external connections to be made up. Mine Safety Appliances Co. handles sale and distribution of the collectors, Mr. Elkin said. The collectors have been approved by the Bureau of Mines.

Return to Auxiliaries

"The pendulum is again swinging" toward the use of auxiliary fans and tubing in providing effective ventilation at rapidly-advancing continuous-mining faces, Mr. Garwood said in tracing the history of their use in Illinois mines. In the 20's such fans were used to provide maximum clearance in mines using large mine cars and large entry-driving machines. There were violations of good practice but in a number of instances, rigid specifications were laid down for their use and results were good. Later, with changes in conditions and the beginnings of federal inspections, the use of auxiliary fans declined and they were finally taken out of the mines.

Now with the application of continuous miners the desirability of using these aids to ventilation is returning, Mr. Garwood said, and new designs and methods of application are being worked out.

At one mine described by Mr. Garwood each machine is equipped with a 12-in Jeffrey forward-curved blade fan operating at 1,750 rpm and capable of delivering 4,150 cfm at free delivery. With 300 ft of tubing the unit operates at over 7 in. w-g giving a velocity of discharge which is ample to keep the face clear ahead of the machine operator. Each machine also is equipped with a spray system to keep float dust under control, and rock dust is applied wet during idle periods. Other mines in Illinois, now legally permitted to length-

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type 6F AERODYNE® fans

For light and medium-duty mine ventilation up to 5" W.G. pressure, Jeffrey offers this new fan. It combines low cost with high efficiency, and includes the fine engineering features of all Aerodyne fans, first introduced by Jeffrey in 1936.

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Catalog 901 describing this equipment will be sent upon request to The Jeffrey Manufacturing Company, Columbus 16, Ohio.

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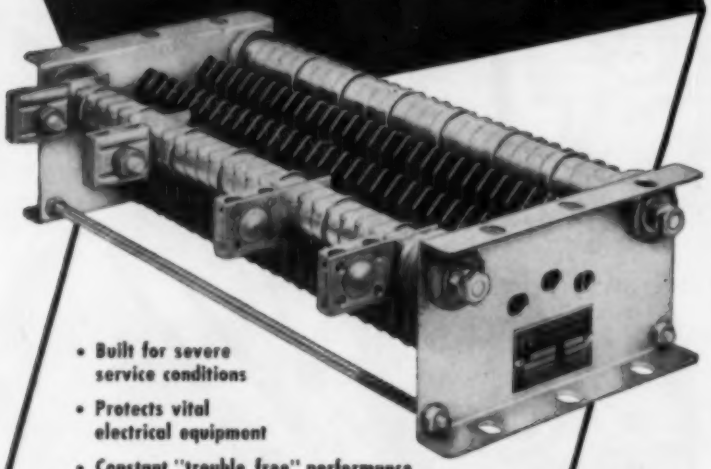

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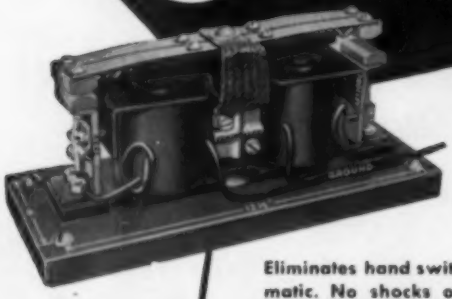

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Mine Inspectors *(Continued)*

en cross-cut center distance, are turning to the use of the fans and tubing to get better face ventilation.

In formal discussion of Messrs. Elkin's and Garwood's papers, Mr. Reak pointed out that methods and practices employed in continuous mining change every two years. In Illinois in gassy mines it has been found that line curtains cannot be depended upon to provide good face ventilation, even with strict line-curtain discipline, Mr. Reak said. However, auxiliary fans and tubing, when used under stipulations laid down by state officials, so far have proven to be most adequate. Special attention must be given to return air courses to see that they are adequately rockdusted at all times, and, by proper dust-allaying practices at the face, the dust problem can be considerably reduced.

Legal Procedures

We continually hear about the responsibility of managing heads of coal companies to maintain a safe mine, and the obligation of subordinates to see that the workmen under their charge maintain a safe place in which to work. What about the safety obligations of the workmen? This was the theme of Mr. Brecker in coming out for fairly administered discipline. The chronic violator should be discharged for his own good and advised to find employment in a less hazardous occupation. But good workmen who take chances, feeling that they are doing themselves and the company a service, should be disciplined in a less drastic manner. Men who stay on the job mean that dollars are not being spent in breaking in substitutes, Mr. Brecker said, in suggesting a safety motto, such as, "Don't get hurt, or we'll go bankrupt." This is not an overstatement when it is realized that direct compensation costs for severe or fatal injuries can amount to $100,000.

If the boss has responsibility for the safety of the workman, then he should have full legal authority to enforce his orders by penalties other than full legal authority to enforce his orders by penalties other than full discharge. There is nothing a person hates more than to lose money, or wages. But there is something more, Mr. Brecker continued. A good workman is humiliated at being caught committing an indiscretion which he knew in the first place he ought not to have done. Good workmen don't usually take chances, but like the motorist, we all occasionally get the urge to commit infractions, especially if there is no "cop" in sight. However, when one is caught, there is no excuse. You pay the penalty, curse the officer (to yourself, of course) and then berate yourself for not paying more attention to regulations.

Mr. Brecker suggested as a possibility the issuing of "summonses" for safety violations. The violator then would have a hearing before the mine superintendent, mine inspector and union representative. This might have a great effect on safety conduct, Mr. Brecker said.

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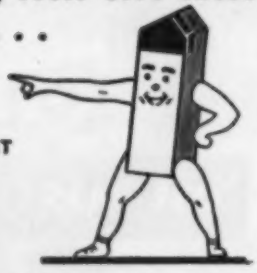

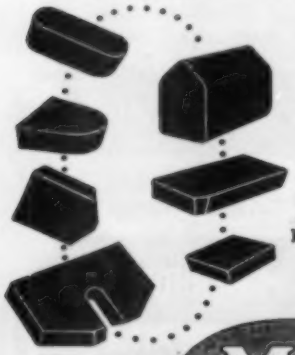

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THE MAN WE MEAN IS A COMPOSITE of the editorial staff of this magazine. For, obviously, no one individual could ever accomplish such a vast business news job. It's the result of many qualified men of diversified and specialized talents.

AND, THERE'S ANOTHER SIDE TO THIS "COMPOSITE MAN," another complete news service which complements the editorial section of this magazine – the advertising pages. It's been said that in a business publication the editorial pages tell "how they do it"–"they" being all the industry's front line of innovators and improvers–and the advertising pages tell "with what." Each issue unfolds an industrial exposition before you – giving a ready panorama of up-to-date tools, materials, equipment.

SUCH A "MAN" IS ON YOUR PAYROLL. Be sure to "listen" regularly and carefully to the practical business information he gathers.

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The campaign was prepared by a volunteer advertising agency in cooperation with The Advertising Council and The National Safety Council. But the over ten million dollars worth of time and space which carry the messages to the public was contributed by media owners or sponsored by business organizations, in the public interest.

Your own plans may readily permit the inclusion of such advertising—both from the view of the vital public service it would perform, and the incalculable good will it would promote for your name, your company, and your product or service.

To find out how easily your own program can tie in with this nationwide effort, and for the complete story on who, what, when and where, we sincerely invite you to write to The National Safety Council, Chicago 11, Illinois.

Published in cooperation with
The National Safety Council
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5,217 new 70-ton hoppers delivered to New York Central's coal car fleet...

...more new hoppers on the way

To date 5,217 new 70-ton coal hoppers, out of the 11,250 ordered last year, have been delivered to the New York Central.

One thousand new high-side, fixed-end gondolas have also joined the New York Central's coal car fleet. These additions plus a continual flow of deliveries of new heavy-duty hoppers are speeding coal from mines to markets.

New York Central is engaged in a program of expanding the total number of hoppers and gondolas in its car fleet. Improvement is also being made in the utilization of existing cars as well as in coal handling equipment and service facilities.

When the coal stocking program shifts into high gear this fall, shippers and receivers can look to New York Central for rapid transportation, efficient handling and dependable deliveries of coal shipments.

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(C&W) 4—12BU 9E Joy Loaders
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(W) 2—Myers Whaley, #3, Track Mounted
(C) 3—6SC Joy Shuttle Cars
(C) 3—10SC Joy Shuttle Cars
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(W) 2—12E7 Joy Shuttle Cars
(W) 2—12E10 Joy Shuttle Cars—Rebuilt
(C) 1—28U Jeffrey, Rubber Mtd.
(C) 2—PL11 Joy Elevators
(W) 4—40 H.P. Acme Self Propelled Air Compressors Permissible

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(W) 1—Barber Green Belt Conveyor, 2000' center to center, 30" wide, mtd. on 10" channel iron in 30' sections. Framing is bolted & may be dismantled with little difficulty. Was used only a very short time & is practically new. WE ARE OFFERING THIS EQUIPMENT AT A BARGAIN PRICE & WILL BE HAPPY TO SUBMIT FURTHER DETAILS ALONG WITH FIRM QUOTATION
(C) 5—MTB 30" Joy Belt Drives, complete w/40 H.P. permissible motors & controls (1—AC, 4—DC) w/ 7,000' structure and 14,000' of Goodyear coal flo belting. All these conveyors are in excellent condition.
(W) 2000'—30" Conveyor belting—good condition
(C&W) 4—28" Hewitt-Robbins & Joy Belt Conveyors, complete
(W) 3—60A Goodman, 24" Conveyors, Approx. 300'
(C&W) 15—61AM, 61EW, 61HG & 61W Jeffrey Chain Conveyors
(W) 4—15" Joy Chain Conveyors Permissible
(C) 6—30" Joy Chain Conveyors, Permissible —Excellent
(C&W) 6—G12½, G15 & G20 Goodman Shakers—AC & DC
(W) 1—PT12 Long Piggyback Conv.
(W) 1—PT15 Long Piggyback Conv.
(W) 32—Goodman Power Duckbills, Model 477, G15's
(C) 1—600' Jeffrey Rope & Button
(W) 1—230', 40" Scraper Conv.
(W) 1—200' Center, 42" Belt Conv. for tipple. We have material to make up any length desired up to 600'.
(W) 1—45' Center, Bucket Elevator, 8"x5"x5½" Buckets.
(W) 1—83' Drag Conv., 10" wide
(W) 1—48' Scraper, 24x8¼" Flights
(W) 1—56' Scraper 30"x8" Flights
(W) 1—84' Flight Conveyor 22"x2½" Flights
(W) 1—98' Drag Conv. 30"x8½" Flights
(W) 1—51' Drag Conv. 24"x8" Flights
(W) 1—20' Drag Conv. 11"x1½" Flights
(W) 2—42"x35' Loading Booms
(C) 1—42"x32' Loading Boom
(C) 1—48' Loading Boom

CUTTING MACHINES

(C&W) 4—7AU Trank Mtd. Sullivans
(W) 4—7B Sullivans
(W) 10—11B Sullivans, 35 & 50 H. P.
(C) 1—12G3 Goodman, 220/440 Volt
(C&W) 1012AB & 12AA Standard Goodmans
(W) 2—112AA Goodmans
(W) 1—212AA Baby Goodman
(C) 1—212G3 Baby Goodman, 220/440
(C) 2—412 CA Goodmans
(W) 6—512 Goodmans
(C) 2—712 Goodmans
(C) 1—824 Goodman, 42" T. G.
(C) 1—122A Goodman—Rubber Mounted
(W) 1—29C Jeffrey Arc Wall
(C) 1—29U Jeffrey 220/440 Volt 42" T.G., Excellent
(C) 6—35BB Jeffrey Coal Cutters w/ bug dusters—Excellent Condition
(C&W) 25—35B & 35BB Jeffrey As Is or Rebuilt w/stub Axle Trucks
(C) 1—35L Jeffrey
(C) 1—Lot Machine Trucks for Jeffrey & Goodman

LOCOMOTIVES

(W) 1—4 ton Ironton, 42" T.G., 25" High—Rebuilt
(W) 1—4 Ton, 8-30 Goodman, 36" T.G., 25" High
(W) 2—4 ton, Goodmans, 36" T.G.
(C) 3—4 Ton MH06 Jeffreys
(C) 1—4 Ton MH12 Jeffrey
(W) 1—6 ton MH150 Jeffrey, Rebuilt 42" T.G., 25" High
(W) 14—6 Ton MH88 Jeffreys, 42" & 44" T.G.
(W) 5—6 Ton HM803 G.E., 36", 42" or 44" T.G.
(W) 5—6 Ton HM823 G.E., 42" or 48" T.G.
(W) 3—6 Ton 6HM835 G.E.
(W) 1—6 Ton G.E. Battery Locomotive All New
(C&W) 3—6 Ton, 3314T Goodmans, 36" & 48" T.G.
(C&W) 2—6 Ton, 904 Westinghouse
(C&W) 4—8 ton MH100 Jeffreys, 36" & 42"
(W) 4—8 Ton HM819 G.E. 42" T.G.
(W) 1—8 Ton Goodman, 36" T.G.
(W) 2—10 Ton MH78, 44" T.G.
(C) 1—12 Ton Jeffrey MH110 42" T.G.
(C) 1—10 Ton West., 48" T.G.
(W) 1—Lot Trucks, Gears & Armatures for Most of Those Locomotives.

MINE CARS

(W) 51—36" T.G. Drop Bottoms
(W) 100—36" T.G. Rotary Dumps 42" High
(C) 16—42" T.G. End Dumps, 19" High
(W) 235—42" T.G. End Dumps, Various Sizes
(W) 35—44" T.G. Drop Bottoms, 10 Ton
(W) 286—44" T.G. Drop Bottoms, Various Sizes
(W) 385—44" T.G. End Dumps, Various makes & sizes.
(W) 353—48" T.G., S. D. Drop Bottoms
(W) 56—48" T.G. Rotary Dumps, 8 Ton
(C) 130—48" T.G. Rotary Dumps

SUB STATIONS

(W) 1—75KW Diesel Generator Set
(C) 1—100KW G.E. Motor Generator Set
(W) 1—150KW Rotary, 2300/4000 Completely Automatic
(W) 1—150KW West. MG Set, 1200 RPM, 2200 V., 275 DC
(C) 1—150KW West. MG Set 200V
(W) 1—150KW G.E. MG Set, 1200 RPM, 2200 V., 275 DC
(C) 1—200KW HCC8, GE Rotary, 2300/4000 V., 275 DC

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RAVEN MINING EQUIPMENT COMPANY

GOOD USED EQUIPMENT—PRICED TO SAVE YOU MONEY

A "Fair Deal" or "No Deal" at "RAMECO"

3—S72 Coal Drills—DC
3—S71 Coal Drills DC
1—G-12½ Shaker Conveyor—size 1 pans
1—G-15 Shaker Conveyor—Coloma type pans
1—Vulcan Shaker Conveyor—Size 0 Pans
1—61-AM Chain Conveyor
Roberts & Schaefer Super-Air-Flow Table, complete with Dust Collecting Equipment
1—Phillips Cross-Over Dump for Mine Cars
1—2 by 6 Aero-Vibe De-Watering Screen
Edison Lamps, Chargers, Spare Parts
Electric Still—Flame Safety Lamps
1—Electric Mine Car Greaser
1—4000 Gal. Storage Tank
Shop Equipment—Drill Press, Air Compressor Grinders, Chain Hoists, Electric Drills, Anvils, Vise—D.C. Benders—A C Welder—hand tools
Sub Stations, complete
Locomotive tires—armatures—supplies, new and used
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907 Whse 10 Ton Locomotive
32-1-4T Goodman 8 Ton Locomotive
Goodman 30-B 5 Ton Locomotive
Goodman 1600-K 3 Ton Locomotive
MH Jeffrey 90 Locomotive
MH Jeffrey 88 Locomotive
Jeffrey 35-BD & 35-B Machines
CR-10 Sullivan, 15" High Machines
35-L Jeffrey 17" High Machines
3—Goodman 212-AA Low-Vein
1—Goodman 312 Low Vein
2—Goodman 212-AA Low Vein—AC
Buddy Sullivan—D C—With Truck
Trunks for 212-AA and Standard Goodman
100 Mine Cars End Dump—23" Above Rail
Fans—AC or DC Motors
Sullivan Hoists—5 HP
Rubber tired Locomotive with 5 by 7 car
Fairbold Conveyor
Miller Auger Machine 5 HP AC

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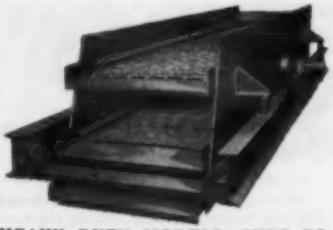
BONDED EQUIPMENT BARGAINS

NEW CURRENT MODELS—IMMEDIATE SHIPMENT FROM OUR FACTORY—WRITE WIRE OR PHONE

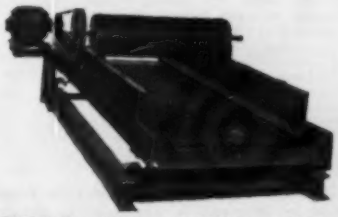
NEW BONDED® HEAVY DUTY VIBRATING SCREENS



HEAVY DUTY MODELS, TYPE BS: Four bearing positive throw eccentric shaft; 3' x 6" to 5' x 14', 1 to 5 decks. Write for New 8-page Bulletin No. 1087.

Model Number	Screening Area	No. of Decks	Sale Price
124AS	2' x 4'	1	$ 443
224AS	2' x 4'	2	472
126AS	2' x 6'	1	472
226AS	2' x 6'	2	501
136AS	3' x 6'	1	581
236AS	3' x 6'	2	688
336AS	3' x 6'	3	956
138AS	3' x 8'	1	676
238AS	3' x 8'	2	815
338AS	3' x 8'	3	996
336BS	3' x 6'	3	1303
436BS	3' x 6'	4	1447
138BS	3' x 8'	1	1231
238BS	3' x 8'	2	1282
338BS	3' x 8'	3	1375
248BS	4' x 8'	2	1865
348BS	4' x 8'	3	2035
2410BS	4' x 10'	2	1953
3410BS	4' x 10'	3	2305
2412BS	4' x 12'	2	2319
3412BS	4' x 12'	3	2635
4412BS	4' x 12'	4	2833

NEW BONDED® GENERAL DUTY VIBRATING SCREENS

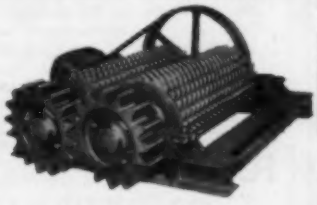


GENERAL DUTY SCREENS, TYPE AS: Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. Write for New 8-page Bulletin No. 1086.

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.

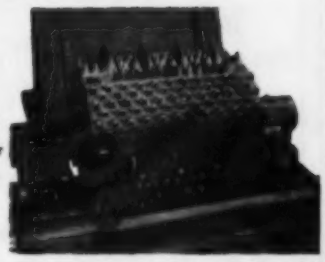
NEW BONDED® COAL CRUSHERS

Single Drive Crusher



Double Drive Crusher

Single Roll Crusher



Bonded double roll crushers are available with single and double drive, in a wide range of roll diameters and face widths. Capacities from small to 500 tons per hour. Tooth roll models are for primary and secondary crushing of coal from stoker to 8". Will take feed sizes to 24". Teeth are designed to break materials sharp and clean with accurate sizing and a minimum of fines. Bonded double drive crushers are for larger resultant sizes to 8". All models are available with fine corrugated or smooth rolls or any combination of same for crushing Cinders, Pumice, Perlite, Other Expanded Lightweight Aggregate, Chemicals, Limestone Chips, Fertilizer and many other materials.

Bonded Single Roll crushers give you a wide range of resultant sizes and reduces run of mine coal in one operation.

All Bonded crushers have heavy coil springs that act as an adjusting mechanism as well as a safety device and they are complete with steel hoppers. Write for Bulletin #1119 describing complete line of Bonded Crushers. Priced from $527.00

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, 1/16" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
18"	25'	$1477	$ 794
18"	45'	2217	1166
18"	70'	3142	1648
18"	85'	3697	1933
18"	100'	4252	2220
18"	130'	5362	2797
20"	25'	1517	828
20"	60'	2882	1533
20"	90'	4052	2145
24"	25'	1590	898
24"	45'	2430	1330
24"	70'	3480	1875
24"	100'	4740	2514
24"	120'	5580	2950
30"	50'	2911	1617
30"	70'	3871	2119
30"	90'	4831	2614
36"	25'	1818	1118
36"	45'	2858	1678
36"	60'	3638	2096
36"	100'	5718	3214

For conveyors longer or shorter than those listed above, add or deduct the following per foot prices according to belt width. Prices include belting. Write For Bulletin #1138.

For 18" belt	19.24 per foot
For 20" belt	20.37 per foot
For 24" belt	21.78 per foot
For 30" belt	24.75 per foot
For 36" belt	27.95 per foot

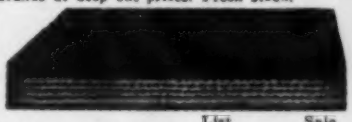
NEW BONDED® FEEDERS

For high tonnage and controlled feed of Coal to Crushers, Screens, Conveyors, Mills and other process machinery. All models available in abrasion resistant alloy steel plate. Capacities to 250 tons per hour. Write for Bulletins #1140 and #1182.

Priced from $275.00

NEW CONVEYOR BELTING SAVE UP TO 25%

Heavy duty 4-ply, 28 oz. duck 1/16" top rubber cover by 1/32" bottom cover 12# to 15# average friction pull; 800# to 1000# average cover tensile rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



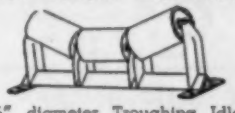
Width	Ply	List Price	Sale Price
18"	4	$4.38 foot	$3.29 foot
20"	4	4.83 foot	3.80 foot
24"	4	5.68 foot	4.26 foot
30"	4	6.97 foot	5.21 foot
36"	4	8.26 foot	6.18 foot

A high grade of heavy duty 4 and 5-ply 28 oz. duck, 1/16" top rubber cover x 1/32" bottom rubber cover, 14# to 19# average friction pull, 2500# to 3000# average cover tensile belting. For more severe service, high tonnages and abrasion resistant. For handling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belt has molded rubber edge.

Width	Ply	List Price	Sale Price
18"	4	$5.23 foot	$3.83 foot
20"	4	5.73 foot	4.27 foot
24"	4	6.74 foot	4.94 foot
30"	4	8.28 foot	6.07 foot
24"	5	7.90 foot	5.78 foot

Other widths, plies, duck weights and cover thicknesses. Available at low prices. Write for Free Sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for:			
14" belt	$18.50	24" belt	$21.25
16" belt	19.25	30" belt	22.00
18" belt	20.50	36" belt	22.75
20" belt	20.75	48" belt	25.50
1-roll, 5" diameter Return Idlers for:			
14" belt	$7.25	24" belt	$ 8.50
16" belt	7.50	30" belt	9.50
18" belt	8.00	36" belt	10.00
20" belt	8.25	48" belt	11.50

All steel. Interchangeable with other well-known makes. Furnished with easily replaceable pre-lubricated Sealed ball bearings. Also can be furnished with greasable type Alemite Fitted bearings at slight additional cost. Maintenance is negligible. Write for Bulletin #1138.

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Latest type equipment, all trackless. Coal conveyed by belt.

3—Joy 11BU Cutting Machines with bugdusters and dual tires.
1—Joy super 14BU, SAE Loading Machine, like new.
2—Joy 14BU, 7RBE Loading Machines, 10 H. P. head motors. Excellent.
1—Joy 14BU, 3PE Loading Machine, first class.
7—Joy 6SC Shuttle Cars, perfect.
6—Joy 32E15 Shuttle Cars, hydraulics reel and steering, All 7½ H. P. motors.
3—Rubber-Tired hydraulic Drills.
3—Rubber Tired Pin-Up Machines.
All the above 250 volt DC.
2—Joy T- Cat Trucks, 220 volt AC.
3—Joy 8-BU Loading Machines, 220 volt AC.
3—Goodman 512 Cutting Machines, 220 volt AC.
12—Rubber-Tired Battery Supply Tractors.
20—Rubber Tired Supply Cars.
5—Jeffrey 52-B tandem drive 30" Belt Conveyors, 500' to 2000' long.
2—Barber-Greene Underground Belt Conveyors, 500' to 1500' long.
30,000' of 30" Belt. Some like new.
1—Joy 30" Slope Belt.
1—300KW Westinghouse Motor Generator Set—perfect.
1—200KW General Electric Motor Generator Set—newly rebuilt.
1—150KW Westinghouse Motor Generator Set—excellent.
12,000' of 500,000 CM and 1,000,000 CM Cable.
Other sizes also.
Complete 5 track tipple with Jeffrey Jig 2 compartment washer, Vibrators, Loading Booms, Conveyers, Car Spotters, etc.
Large stock of mine supplies for all the above.

Buy direct from the mine and take advantage of the huge savings! Immediate delivery can be arranged to any point in America.

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Save up to $3,000 on one of our unused Army trucks. See for yourself how TWO of our trucks cost you even LESS than *one* new truck.

Compare our Tandem Axle Trucks with front wheel drive, 10 forward speeds, overdrive and new mud and snow tires with similar equipment elsewhere.

Investigate now! . . . There's no obligation . . . and we deliver on approval!

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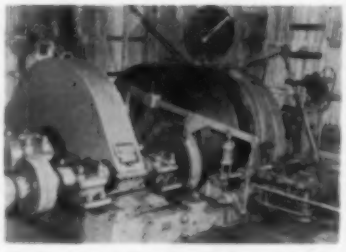
250 HP TWO-COMPARTMENT VULCAN SHAFT HOIST



1—250 HP Vulcan Cylindro-Conical 2-compartment mine shaft hoist, grooved for 1¼" rope, Lilly Controls, post brakes, herringbone gears, 10,500 rope pull at 1260 FPM. 250 HP 2200 Volt motor, designed for 578' maximum depth.

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1—14BU SAE Joy Super Loader, 250 Volt D. C.—Used for 6 months.
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500—No. 1531, Used, 7" Deep Flanged Edge Piggyback Pans.—New 1954

The above in excellent operating condition. Attractively priced.

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Mount Hope, W. Va.

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1—American Ring Pulverizer, Type 42S-300 Ton Capacity per hour, direct connected to G.E. 100 HP, 720 RPM, 3 ph. 220/440 volt, totally enclosed Induction Motor. Excellent Condition.

1—American Ring Type W. C. 24 Crusher like New.

3—Westinghouse 333 KVA, Type SL, Volts 2300/4160Y/230/460. Late type.

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PHONE 121 or 42 DUGGER, INDIANA W. M. HUNLEY

GOOD USED COAL STRIPPING EQUIPMENT

625 Page Diesel Drag, 150', 10 yd.
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2400 Lima Dragline, 130', 5 yd.
111-M Marion Diesel Drag, 80', 5 yd.
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1201 Lima Comb. Shovel & Crane
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5480 Marion Electric 15 yd. Shovel
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120-B Bucyrus Erie 4 yd. Electric Shovel
1201 Lima Standard 3½ yd. Shovel
1055 P&H 3½ yd. Standard Shovel
111-M Marion 3 yd. H. L. Shovel
1201 Lima 2½ yd. H. L. Shovel
955 P&H 2½ yd. Standard Shovel
802 Lima Comb. H. L. Shovel & Drag
3500 Manitowoc 2 yd. H. L. Shovel
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Unit 1020 ¾ yd. Shovel
P & H, Lorain, Bucyrus Erie Truck Cranes
600 Reich Heavy Truck Mounted Rotary Air Drills
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J. T. Fish has a reputation of dependability in buying or selling mining machinery, whether it be one piece, complete plant, coal mine, or railroad.

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Buy from the largest stock of good mining equipment in America. Includes all types of Joy Loaders, Shuttle Cars, Cat Trucks, Cutting Machines, Locomotives, Belt Conveyors, Chain Conveyors, Substations, etc.

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1—Joy 8AE Super 14BU Loader.
2—Joy 14BU Loaders, Low pedestal, 7AE.
2—Joy 14BU Loaders, medium pedestal, 7RDE.
1—Joy 14BU Loader, high pedestal.
2—Joy 12BU Loaders, 9E, latest type.
1—Joy 20BU Loader, latest type.
3—Joy 11BU Loaders.
1—Joy 11BU Loader, latest type.
2—Joy 8BU Loaders, 250 volt DC.
1—Joy 8BU Loader, 34" overall height.
2—Joy 8BU Loaders, 220 volt AC.
2—Joy curved bar heads, complete.
1—Goodman 960 Loader on cats, excellent.
6—Joy 6SC Shuttle cars, rebuilt.
1—Joy 5SC Shuttle Car, rebuilt.
2—Joy 32E9 Shuttle Cars.
2—Joy 32E10 Shuttle Cars, rebuilt.
6—Joy 32E15 Shuttle Cars, rebuilt.
2—Joy 32E16 Shuttle Cars, rebuilt.
2—Joy T-1 Standard Cat Trucks 220 AC
1—Joy T-1 Standard Cat Truck, 250 DC.
2—Joy 5BI Baby Machines, 250 volt DC.
4—Joy 11B Cutting Machines, like new.
1—Joy 7B Cutting Machine, like new.
3—Goodman 512 Machines with Bugdusters.
1—Goodman Machine on Cats, 31" high. All hydraulic.
1—Goodman 512 Cutting Machine, perfect.
2—Goodman 512 Cutting Machines, 220 volt AC.
1—Jeffrey 29UR Cutting Machine, Universal Head, cuts anywhere in seam, 38" hi, on rubber tires, perfect.
1—Lee Norse low vein Machine Carriers.

LOCOMOTIVES

2—Jeffrey MH-2154's, 15 tons, perfect, 42".
4—Jeffrey, 13 ton, type MH-110, 36", 42", and 44" Ga.
3—Jeffrey, 10 ton, type MH-78, 42" and 48" Ga.
12—Jeffrey, 16 ton, type MH-88, 42", 44" and 48" Ga.
2—Jeffrey, 9 ton, type MH-100, armor plate frames.
2—Jeffrey, 6 ton, type 2186, 22" above rail, perfect.
3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" Ga.
2—G. E., 4 ton, type 825 Locomotives, 22" high.
10—G. E. 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G. E., 8 ton, type 822 Locomotive, 44" Ga.
3—G. E., 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
1—Goodman, 4 ton, 8-30 Locomotive, 22" above rail.
1—Goodman, 6 ton, Locomotive, 26" high.
2—Goodman, type 33, 6 ton, 44" and 48" Ga.
3—Goodman, 9 ton, type 32A, 36", 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
2—Westinghouse, type 906, 44" and 48" Ga.
2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.

TIPPLE EQUIPMENT

1—Cedar Rapids portable super Screening Plant.
1—Allis-Chalmers 5' x 14' Rippfle Vibrator.
1—5' x 14' Robbins double deck Vibrator.
1—4' x 10' Robbins Gyrex Vibrator.
1—McNally Pittsburgh all steel tipple, four track, perfect.
1—Complete five track Tipple, all steel, with two compartment Jeffrey washer.
Feeders, Drag Conveyors, and Loading Booms.

CUTTING MACHINES

1—Jeffrey 29UR Universal on rubber.
1—Goodman on cats, 31" overall height.
1—Baby Goodman 212, rebuilt, 250 Volt DC.
2—Goodman 212 G-3 220 Volt AC.
1—Goodman 512, 18" high.
2—Goodman 512's with Bugdusters, like new.
10—Goodman 512's, rebuilt, or as removed from service.
2—Joy 5BI Baby Machines, 250 Volt DC.
2—Goodman 512 Cutting Machines, 220 Volt AC.
1—Goodman 12AA's and 112AA's.
2—Goodman 124 Stabbers.
2—Goodman 724 Stabbers.
15—Jeffrey 35L's, like new, 17" high.
2—Jeffrey 35L's, on low vein trucks.
15—Jeffrey 35B's and 35BB's.
2—Jeffrey 29B's on track.
2—Jeffrey 29C's, track mounted.
1—Jeffrey 29L, on track, perfect.
2—Sullivan CR-10's, 13" high.

LOADING MACHINES

17—Joy Loaders, all types.
2—Jeffrey 61 CLR's on rubber, 26".
3—Jeffrey L-500 Loaders.
2—Myers Whaley No. 3 Automat Loaders.
2—Clarkson Loaders, 26" above rail.

CONVEYORS

2—Jeffrey 52-B, 30" Belt Conveyors, 1500' each. Excellent.
4—Joy 30" Underground Belt Conveyors, 500' to 2000' each. Excellent.
1—Barber Greene 30" Belt Conveyor, 1800'. Excellent.
1—Robins 30" Conveyor, 180'.
3,000' Conveyor Belt 30".
2—61EW Elevating Conveyors.
2—61WH 15" Room Conveyors, 300 ft.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.
3—Long 400 DBH 15" Chain Conveyors, 25 H. P. Motor—new.

CONVERTERS AND DIESEL PLANTS

1—50KW, G. E. TC-6, 275 Volt, Rotary Converter.
1—150KW, 6 phase, Allis-Chalmers Rotary Converters.
1—150KW G. E. HCC-6, 275 volt Rotary Converter.
1—150KW, 6 phase, Allis-Chalmers Rotary Converter, 275 volt DC, perfect.
1—200KW G. E. HCC-6 Rotary Converter, 275 volt DC.
3—300KW, G. E. HCC-6 Rotary Converters, 275 DC.
1—200KW Westinghouse Rotary Converter, 275 DC
1—200KW Allis-Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
(All the above with 6900/13800 and/or 2300/4000 primary transformers.)
1—65KW MG Set, General Electric, 275 DC volt, 220 volt AC.
2—KW MG Set, General Electric and Westinghouse.
1—200KW MG Set, Westinghouse, rebuilt.
2—150KW Allis-Chalmers MG Set, 275 DC volt, excellent, 220-440 volt.
1—300KW Westinghouse, 600 volt, MG Set, rebuilt.
1—300KW Westinghouse, 275 volt, MG Set, rebuilt.
1—560KW Westinghouse, 275 volt, MG Set, perfect.
1—Cummins 125KW Diesel with 250 volt DC Generator.
1—700 H. P. Shaft Heist, complete.
Complete steam plant, will sell all or any part
Boilers, like new, 1100 H. P. and 500 H. P. Also transformers, turbines, etc.
3—Complete Tipples with Cleaning Plants, "2 All Steel".

MISCELLANOUS

Battery Supply Tractors, rubber tired.
10—Air Compressors, 1 H. P. to 40 H. P.
40—Mine Pumps, all types.
2—Barber Greene self propelled Bucket Elevators.
Pipe, Plastic, Steel, Transit, all sizes 1" to 6".
45 Mine Cars, drop bottom, 42" Ga.
30 Mine Cars, Drop bottom, 44" Ga.
50 Mine Cars, 48" Ga. drop bottom, 20" above rail.
100 Mine Cars, 18" high, end dump, 44" Ga.
90 Mine Cars, end dump, 20" high, 48" Ga.
15 Brown Fayro HKL and HG Car Spotters.
1—12 Ton Differential Slate Larry
Incline Hoists, 25 to 50 H. P.
1—Jeffrey 6 ft. Aerodyne Fan.
1—Storage Tank, 8000 Gallon.
2—Storage Tanks, 4,000 Gallon.
Five Gallon G. I. Cans.
400 tons Rails, 25# to 60#.
10 Tons Copper Trolley and Feeder.
300 Transformers from 1 to 2,000 KVA, 110 to 13,800 primary volts.
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—ADVERTISERS IN THIS ISSUE—

***Indicates more product information may be found in company advertising appearing in COAL AGE 1956 Mid-July Mining Guidebook and Buying Directory Issue. Check your Guidebook index.**

Acker Drill Co., Inc. 168
Acme Machinery Co. 151
Alemite div. Stewart Warner Corp. 179
*Allegheny Ludlum Steel Corp. 36
*Allis-Chalmers General Products Div. 137, 175
Allis-Chalmers Construction Machinery Div. 33, 35
*ACF Industries Inc., American Car & Foundry Co. Third Cover
American Cable div. American Chain & Cable Co. 131
American Oil Co. 10
*American Pulverizer Co. 150
*American Steel & Wire div. United States Steel Corp. 22–23, 34
*Anaconda Wire & Cable Co. 173
Armstrong-Bray & Co. 153
Ashland Oil Co. 126

Barber-Greene Co. 46
Bearings, Inc. 141
Bethlehem Steel Co. 28, 127, 157
Bird Machine Co. 4
*Bixby-Zimmer Engineering Co. 148
Bucyrus-Erie Co. 13, 161

*Cardox Corp. 43
Caterpillar Tractor Co. 119, 192
*Centrifugal & Mechanical Industries, Inc. 124
Chicago Pneumatic Tool Co. 107
Cities Service Oil Co. 123
Clark Equipment Co. 96–97

*Denver Equipment Co. 158
*Detroit Diesel Engine Div. General Motors Corp. 38
Differential Steel Car Co. 130
Dodge Div. Chrysler Corp. 181
Dorr-Oliver, Inc. 163
duPont de Nemours & Co., E. I. (Elastomers Div.) 167
duPont de Nemours & Co., E. I. (Explosives Div.) 115
Durakool, Inc. 122

Ensign Bickford Co. 48
Ensign Electric Co. 172
*Exide Industrial Div. Electric Storage Battery Co. 32B

Fairbanks, Morse & Co. 135
Fairmont Machinery Co. 147
Flood City Brass & Electric Co. 144

*Gates Rubber Co. 145
General Cable Co. 149
General Electric Co. 20–21
General Electric Co. (Construction Materials Div.) 169
General Tire & Rubber Co. 125
Goodman Manufacturing Co. 24–25
Goodrich Chemical Co. 121
Goodrich Industrial Products Co., B. F. 1
Goodrich Tire Co., B. F. div. B. F. Goodrich Co. 109
Guyan Machinery Co. 162

Hamilton Rubber Co. 37
*Harnischfeger Corp. 26–27
*Hendrick Manufacturing Co. 168
*Hewitt-Robins, Inc. 160
Heyl & Patterson, Inc. 47

International Harvester Co. (Payhaulers) 44–45

Jeffrey Manufacturing Co. 2, 146, 176
Jones & Laughlin Steel Corp. 143
Joy Manufacturing Co. 30–31, 146, 159

Kennametal, Inc. 95
Koehring Co. 18–19

Lee-Norse Co. 17
*LeRoi div. Westinghouse Air Brake Co. 39
*LeTourneau-Westinghouse Co. 111, 113
Link-Belt Co. Fourth Cover
Long Co. 133
Lubriplate Div. Fiske Bros. Refining Co. 164
*Ludlow-Saylor Wire Cloth Co. 128
Lukens Steel Co. 32

Manning Co., Chas. E. 122
*McLanahan & Stone Corp. 134
*McNally Pittsburg Manufacturing Corp. 132
Metal Carbides Corp. 180
*Mine Safety Appliances Co. Second Cover

New York Central Systems 183

Ohio Brass Co. 101, 165
Okonite Co. Insert between pp. 32–33

*Paria Manufacturing Co. 174
Parkersburg Rig & Reel Co. 166
Pattin Manufacturing Co. 124
Penn Machine Co. 170
Porter Co., Inc., H. K. Leschen Wire Rope Div. 154
West VirginiaWorks, Connors Steel Div. 155
Post-Glover Electric Co. 178

Reynolds Metals Co. 117
Roebling Sons Corp., John A. 177
*Rome Cable Corp. 99
Ryerson & Son, Inc., Joseph T. 6

Sanford-Day Iron Works, Inc. 14–15
Scandinavia Belting Co. 16
Schroeder Bros. 153
Searchlight Section 184–189
Simplex Wire & Cable Co. 3
Sinclair Refining Co. 152
*Stamler Corp., W. R. 126
Standard Oil Co. of Indiana 29

*Texas Co. 8–9
Thermoid Co. 191
Timken Roller Bearing Co. 40–41

United States Rubber Co. (Mechanical Goods Div.) 103
*United States Steel Corp. 105, 171

*Victaulic Co. of America 120

Wickwire Spencer Steel Div. Colorado Fuel & Iron Corp. 42
Wilmot Engineering Co. 139

PROFESSIONAL SERVICES 184

CLASSIFIED ADVERTISING
F. J Eberle, Business Mgr.

EMPLOYMENT OPPORTUNITIES 185
SPECIAL SERVICES 185
EQUIPMENT (Used or Surplus New) For Sale 186–189
WANTED Equipment 186

ADVERTISING SALES STAFF

Atlanta 3....M. H. Miller, 1301 Rhodes-Haverty Bldg., Jackson 3-6951
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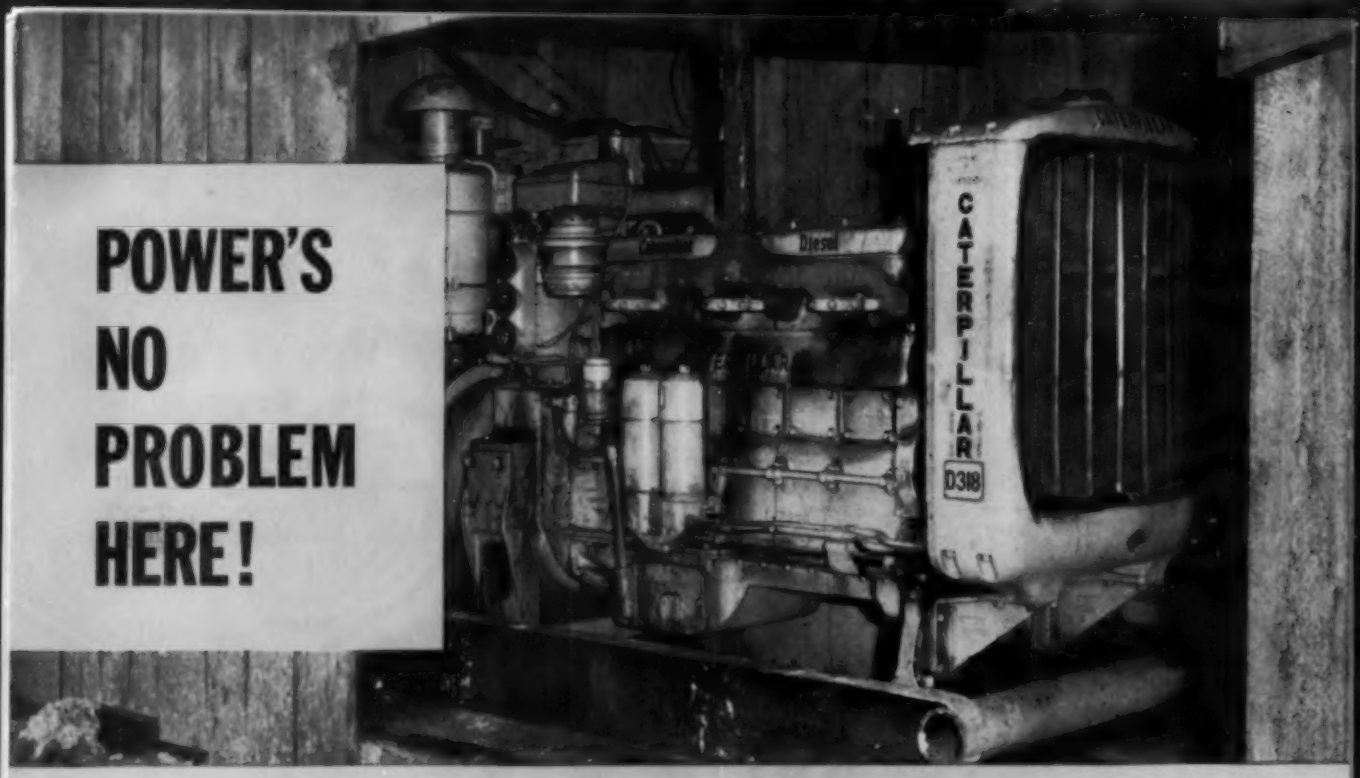

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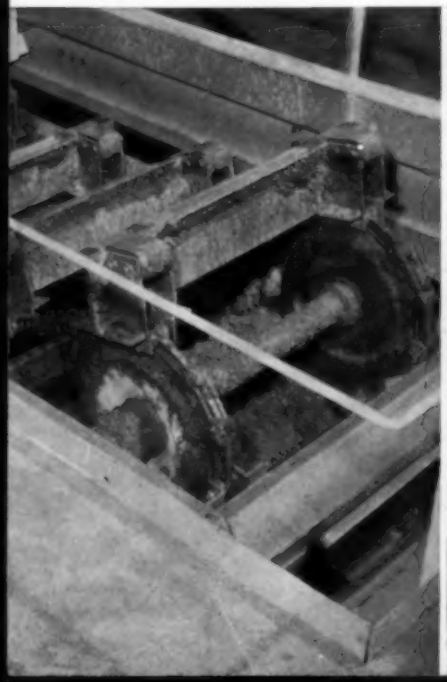
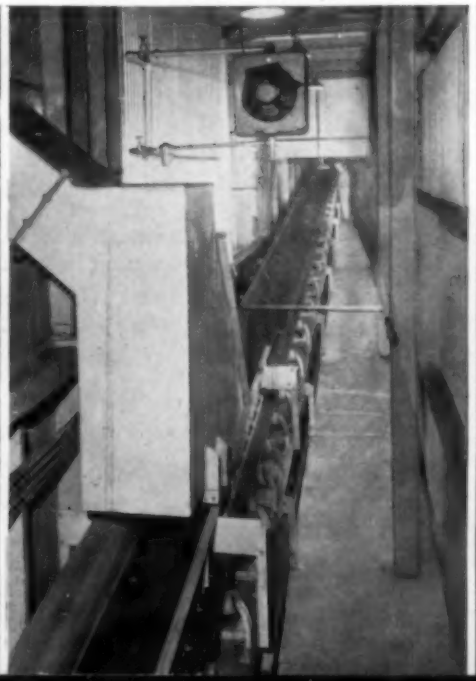
UPPER TAIL SHAFT of refuse drag tank shows 4-ft. wide channel flight drag conveyor which carries 40 tph of ¼" to 48-mesh table refuse to refuse conveyor.



REFUSE BELT CONVEYOR — 36-in. wide — delivers minus 4-in. washed refuse and mine rock to refuse bin for disposal by aerial tramway. Conveyor has 370-tph capacity and operates at 250 fpm.



REFUSE BIN has 8,000 cu. ft. capacity. Material is delivered to bin by enclosed overhead refuse conveyor and discharged through hopper to aerial tramway beginning beneath the bin.

14,590